

In This Issue—No. 5 of the Flat Rate Series

# MOTOR AGE

Vol. XLIV  
Number 11

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, SEPTEMBER 13, 1923

Thirty-five Cents a Copy  
Three Dollars a Year



The Champion Service Kit is a distinct aid to Champion sales. See that you have a supply on hand.

## Boost Business With Champion Service Kit

Champion Service Kit has been a distinct aid to greater business. Dealers everywhere are enthusiastic over this convenience for motorists.

Your spark plug stock is not complete unless you have a supply of Champion Kits. Ask your jobber's salesman on his next trip.

**Champion Spark Plug Company, Toledo, Ohio**  
Champion Spark Plug Company of Canada, Ltd., Windsor, Ontario

# CHAMPION

*Dependable for Every Engine*

Champion X is the standard spark plug for Ford Cars and Trucks and Fordson Tractors. Recognized by dealers and owners for 10 years as the most economical and efficient spark plug. Sold by dealers everywhere.



# Beauty!

*That's the Thing,  
After All  
That Sells the*

## Thoma SUNBEAM Visor

THE motorist buys a visor for protection, of course—but at the same time he wants it to dress up his car. He can get a cheap-looking, poorly constructed visor, or one of flashy looking flimsy materials, at almost any price he wants to pay, but he would rather pay a little more for a Sunbeam, the Visor that gives him maximum protection and at the same time beautifies his car.

And here is a thing of vital importance to you—

When you sell a Sunbeam you make two or three times the profit that you would make on the sale of a cheap visor. A visor is a product you should sell but once to a customer—WHY NOT GET A WORTH-WHILE PROFIT ON EACH SALE!

You perform a real service for your customer when you sell him a Sunbeam; and at the same time you make a real profit for yourself. Write for details of liberal co-operative sales plan.

### Sunbeam Junior

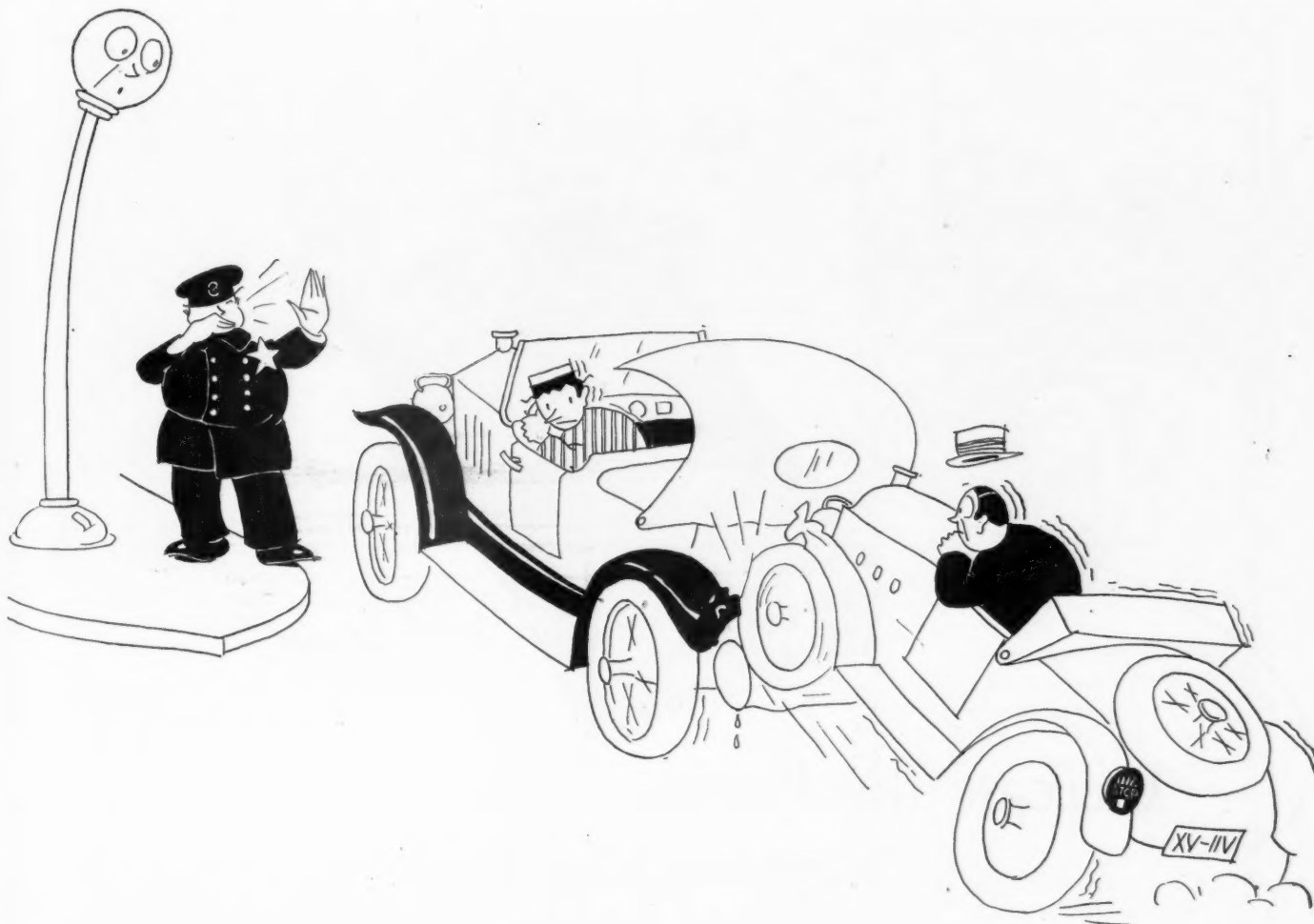
The high-grade, moderately priced glass Visor for Overland, Chevrolet, Star and Ford—a CLASS product with a MASS sale. All Sunbeam Visors, both standard and Junior, furnished in green, amber and Cobalt blue.

Manufactured by



Fairfield, Ia.





# Stewart BUMPERS

He who drives a wicked wagon with either four or two wheel brakes should be well protected, front and rear.

He who follows behind may find himself climbing into the rear seat of the car ahead.

The price of new fenders and lights alone would have a fifty dollar bill yelling for help.

The far-sighted car owner invests in Stewart Bumper Protection and keeps his car out of the repair shop.

**Dealers:** Show this advertisement to your customers. Place it where they can see it. It will show them the present great need for Stewart 100% Bumper Protection.



De Luxe Model 175  
\$23.00  
Western Price, \$26.00

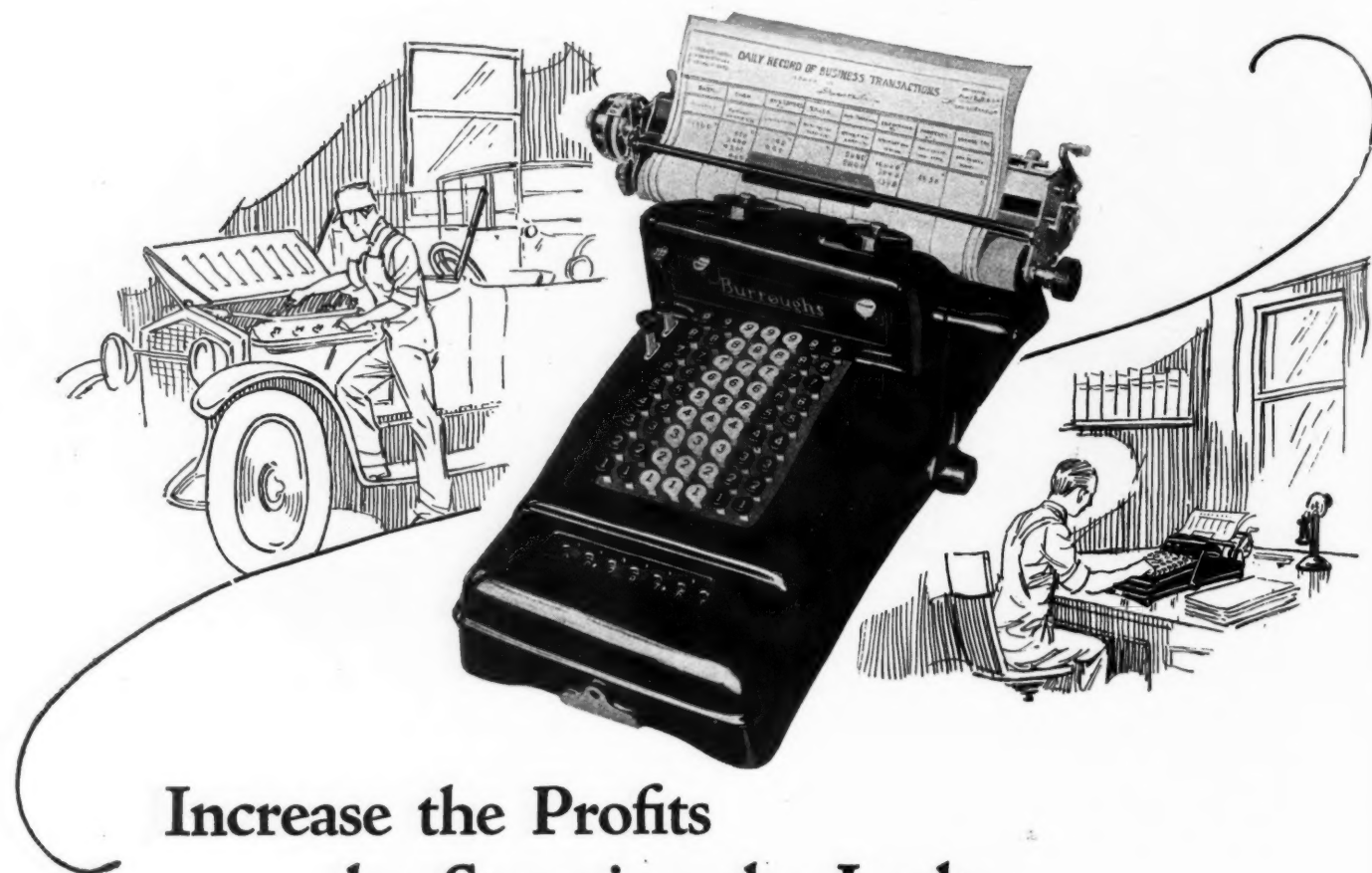
**Stewart**

CUSTOMBILT ACCESSORIES

USED ON 8 MILLION CARS

All-steel Models  
for all cars

STEWART-WARNER SPEEDOMETER CORPORATION, CHICAGO, U. S. A.



## Increase the Profits by Stopping the Leaks

**A**RE you trusting your figure work to a weary brain and a lead pencil? Then do not wonder if your profit is being reduced to the vanishing point. Undetected errors and preventable losses are doing it!

Just remember, every loss must be paid for out of your profits; the fact that you do not discover the leaks and errors does not lessen the price you pay.

This Burroughs will increase your profits by stopping leaks. You can use it every day for analyzing sales, proving ledger posting, checking invoices, accounting for job time, etc.

At the end of the month it will help balance the ledger accounts, audit statements, prove bank balance and lighten many other tasks. It adds, subtracts, multiplies and divides.

Call the Burroughs man for a demonstration on your work or mail the coupon for additional information.

**BETTER FIGURES  
make  
BIGGER PROFITS**

# Burroughs

**ADDING • BOOKKEEPING • BILLING • CALCULATING MACHINES**

Burroughs Adding  
Machine Co.  
6018 Second Blvd.  
Detroit, Mich.

Gentlemen: Please tell  
me how I can increase  
my profits with a wide  
carriage adding machine.

Name .....

Address .....

# MOTOR AGE

Reg. U. S. Pat. Off.

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THE CLASS JOURNAL COMPANY

MALLERS BUILDING  
59 East Madison Street, CHICAGO

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### SUBSCRIPTION RATES

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Subscriptions accepted only from the Automotive Trade

Entered as Second Class Matter Sept. 19, 1899, at the Post Office  
at Chicago, Ill., under Act of March 6, 1879.

## The Advantages of Selling "Known Quality"—

A recent letter from a Goodrich dealer contains a paragraph that will interest you. We quote it—

*"Have just read your last advertisement in the Saturday Evening Post and want to say that not a week passes but what we feel good results from Goodrich national advertising."*

Price Tire Service,  
Larned, Kansas

Goodrich advertising does bring an immense amount of business to our dealers, and Goodrich dealer-cooperation plans are responsible for more. But—after all it is the Tire itself that sells.

The best advertising and the closest dealer cooperation in the world could not sell an inferior or even mediocre tire for long.

The public recognizes just one feature—Service. That single idea has associated itself with Goodrich Tires and become firmly fixed in the public mind. Goodrich dealers cannot help but benefit from this fact.

THE B. F. GOODRICH RUBBER CO.  
Akron, Ohio

# Goodrich TIRES

"Best in the Long Run"







## Only One Left— It Was Full Yesterday

There's turn-over for you!

This handsome, always-on-the-job "salesman" will boost your timer business. All Milwaukie Timers now shipped this way—10 to the box. No extra cost to you. Helps you hook up to Milwaukie Timer advertising in The Saturday Evening Post, American Magazine, and the big farm and motor papers. Use it!

In hundreds of accessory stores and garages, the new Milwaukie Timer Display Box is putting pep into timer business. Show this attractive "salesman" on your counter, and watch sales jump. Quick sales—at a good profit—not much money tied up in stock! Those are the Milwaukie Timer "features" that appeal to you. Milwaukie Timer quality goes without saying—you know it's right, and your trade knows it. Why waste time pushing and "explaining" timers of unknown worth? Concentrate on Milwaukie. Make more money on timers. The Display Box on your counter will help a lot. Put it there and see.

Re-order Milwaukie Timers today—from your jobber.

**MILWAUKEE MOTOR PRODUCTS, Inc.**  
MILWAUKEE WISCONSIN

(Timer Builders for Over 18 Years)



# MILWAUKEE TIMER for FORDS

**Sells FAST at \$2.00**  
(In Canada \$2.75)

# STUDEBAKER



## The Retail Salesman Pays the Penalty of Wasted Effort

Every hour of a retail salesman's time is worth a definite amount of money to him.

He establishes its value himself through his ability, effort, and knowledge of the product.

Whether this value be large or small depends largely on another factor which many salesmen overlook when they try to analyze their reasons for only a mediocre success.

Strange to say, this factor is the first principle of good merchandising. It is simply this: sell a quality product which is offered in sufficient variety to appeal to the largest number of buyers.

Studebaker has the product. The line is complete—three six-cylinder models of highest quality in twelve body types—a car of the correct size, style and price to attract the whole quality market. Every prospect on whom a Studebaker salesman calls is a possible purchaser.

The time you put in on prospects whom you can't sell because you can't fit them with the car they want and need is wasted effort.

How much does your wasted effort cost you?

How much is your time worth?

How much could you make it worth selling Studebaker cars?

The salesman who is handicapped by a limited line of cars is not making the most of the opportunities offered by the automobile business. See the local Studebaker dealer. He can always make room for another capable retail man.

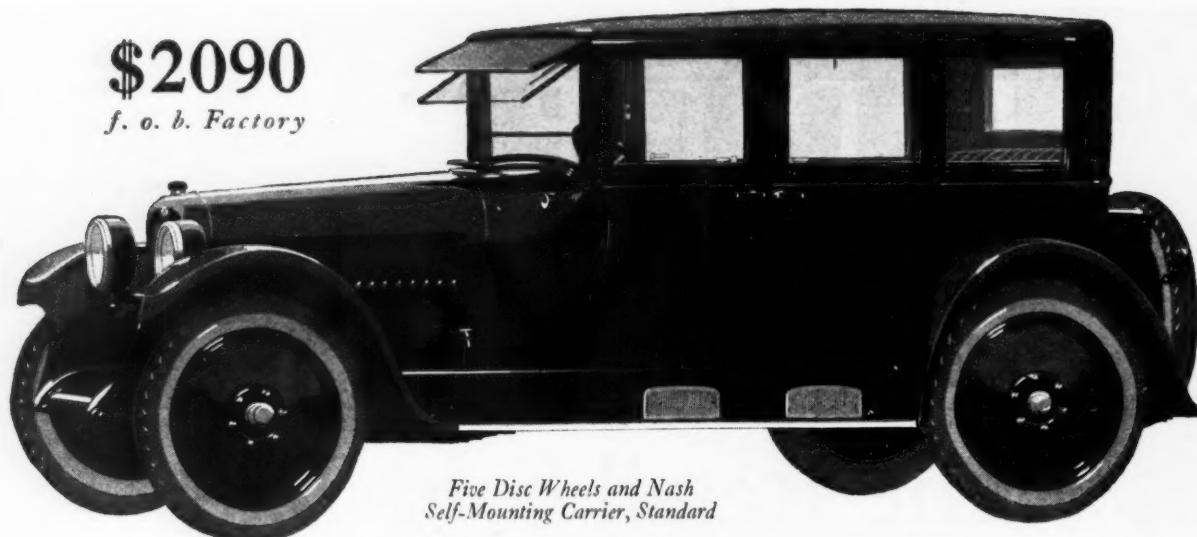
THE STUDEBAKER CORPORATION OF AMERICA  
South Bend, Indiana

1924 MODELS AND PRICES—f. o. b. factory					
LIGHT-SIX 5-Pass., 112" W. B., 40 H. P.		SPECIAL-SIX 5-Pass., 119" W. B., 50 H. P.		BIG-SIX 7-Pass., 126" W. B., 60 H. P.	
Touring.....	\$995	Touring.....	\$1350	Touring.....	\$1750
Roadster (3-Pass.).....	975	Roadster (2-Pass.).....	1325	Speedster (5-Pass.).....	1835
Coupe-Roadster (2-Pass.).....	1225	Coupe (5-Pass.).....	1975	Coupe (5-Pass.).....	2550
Sedan.....	1550	Sedan.....	2050	Sedan.....	2750

T H I S I S A S T U D E B A K E R Y E A R

**\$2090**

*f. o. b. Factory*



*Five Disc Wheels and Nash  
Self-Mounting Carrier, Standard*

*Optional as to color. Sky Blue or Maroon with Black Radiator, Trimmings and Running Gear.*

### A New "Six" Sales Attraction

## *The New Four-Door Coupe*

Nash was first to see the sales possibilities of an enclosed car of the compact Four-Door type.

And Nash straightway originated this new body style and placed the car in dealers' hands where it immediately became one of the best sellers.

Now Nash introduces a finer, abler, more impressive Four-Door Coupe, yet holds the price to the former low-level.

So that from every point of view this new model is a vastly greater selling value.

It can be counted upon to appeal strongly to an even wider market than its successful predecessor.

Smoother, sweeter, more flexible perform-

ance is obtained through important engineering advancements.

Valuable additions have been made to the extensive equipment.

The new type, low-sweeping fenders dipping gracefully further toward the road both at rear and front emphasize the low-hung aspect of the car.

Kick plates protect the lustrous finish below the doors; there's a new instrument board, and many additional fittings and conveniences to attract the prospect.

Don't wait longer to make your change to the Nash line.

There's good territory ready for you. *Write at once.*

**No Advance in Prices on New Line**

# NASH

**The Nash Motors Company, Kenosha, Wisconsin**

(1927)



## What Any Mechanic Will Tell You About COLE Body Construction



"The body construction of the new Cole Master Model is the best I ever saw. The boss has a new Brouette and he told me to look it over. First I looked under the hood—then at the body.

"It's an extra rigid body, constructed of the hardest wood, fashioned with steel—has tight joints that will not work loose—and extra door lugs to prevent door gaps and rattles. The strong Cole chassis is topped with a body that *is* a body—it has a rigid construction that will not "twist," rattle or creak even after many thousands of miles of driving.

"The finished job makes the Cole unquestionably the best built as well as the most beautiful car that goes along our boulevards.

"The dealer that carries a Cole franchise and sells the Master Model Cole certainly "has the goods" in the Cole car, from front bumper to rear bumper."

**COLE MOTOR CAR COMPANY**  
INDIANAPOLIS, U. S. A.

# COLE

*There's a Touch of Tomorrow in All Cole Does Today*

## COX BUMPERS

OIL TEMPERED AND 2-TON TESTED

### of Mo-lyb-den-um Steel



THE COX BROS. MANUFACTURING CO., Inc., with plants at Albany and Cleveland, has been combined with The Eaton Axle and Spring Company and will constitute the Bumper Division of this company. The Cox Brothers will remain in active charge of the Bumper plants, with William G. Cox in general charge of sales and Theodore M. Cox in charge of production.

The same high character of product will be produced, with greatly enlarged production facilities and several more service stations.

A comprehensive advertising plan including pages in The Saturday Evening Post and other National mediums will bring Cox Bumpers to the attention of all motorists.

Beautiful in design and finish — made of Molybdenum steel, combining extreme lightness with a far greater impact resistance — with Custom-Built attachments that insure a perfect fit and balance—Cox Bumpers very definitely lead in every essential of quality and usefulness.

**The EATON AXLE & SPRING COMPANY**  
CLEVELAND

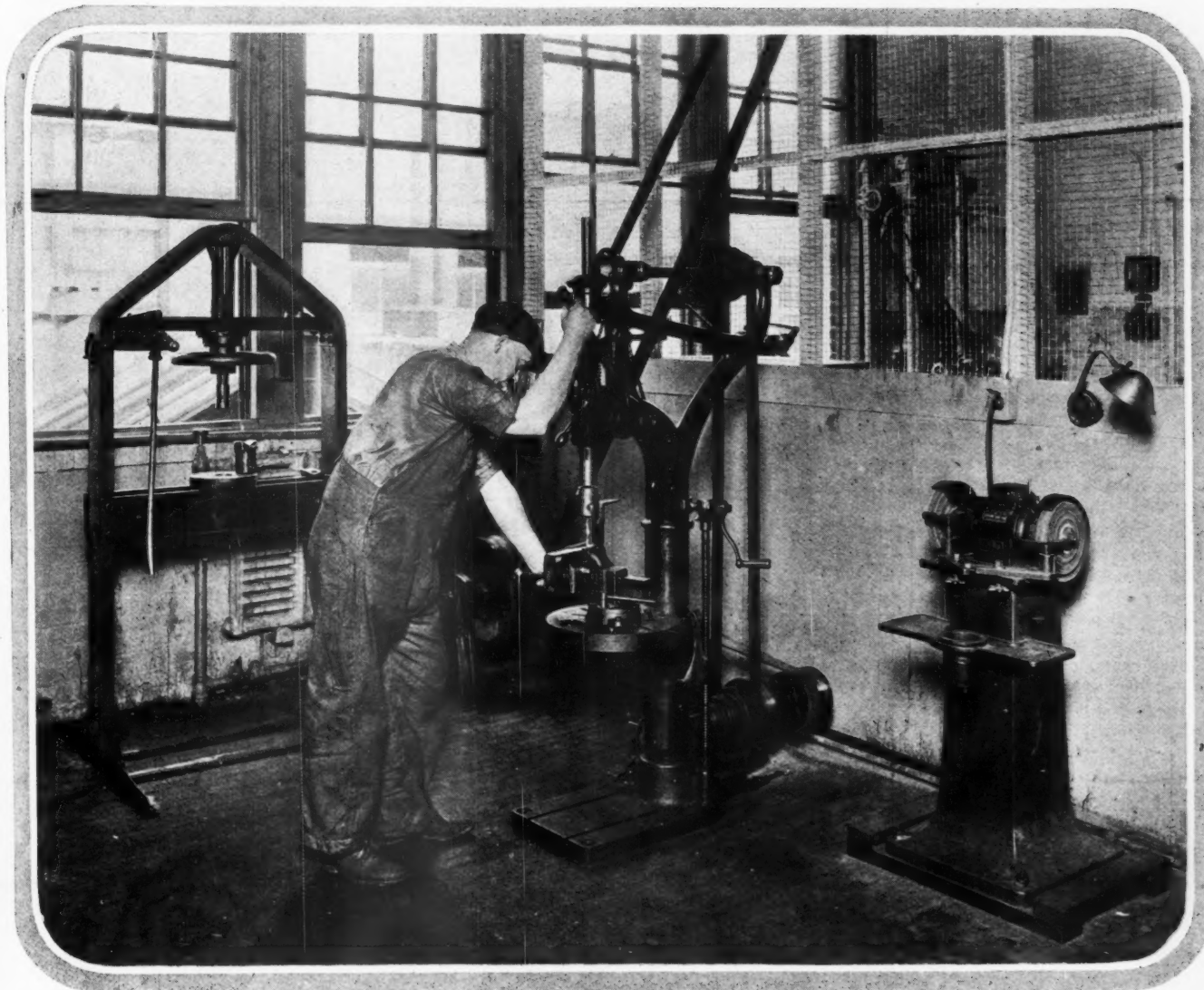


## COX BUMPERS

OIL TEMPERED AND 2-TON TESTED

### of Mo-lyb-den-um Steel

# MOTOR AGE



Look around your shop and see if the machinery set up is as good as this, the floor as clean and the same general neatness prevails. You always will find that the shops which are paying a profit are those run on an orderly basis. Note, for example, the light over the grinder. It is a little item, but imagine the time saved over wasteful hunting for a drop light to plug in somewhere.

## A Clean, Systematic Shop Cuts Overhead

*Flat Rate and Piecework Only Possible Where Orderliness and Good Methods Prevail*

By B. M. Ikert

**D**ELAYS in procuring stock and tools often take as much time in a repair job as the directly productive work.

To put this another way is to say a mechanic spends about as much time looking for tools and parts as he does in using the tools and installing the parts.

Rearrangement of the stockroom and a more orderly kept shop will very often reduce the overhead materially and add to the profits of the shop.

The shops which in the past have told us that they

barely break even invariably have been those in which system and order has been totally lacking and in which the mechanics did too much work of an unproductive nature.

Loose shop methods do not go hand in hand with the flat rate system of selling service and maintenance and therefore, you invariably will find that the shop with the loose methods operates on the old hit and miss "so much per hour basis." If the mechanic spends an hour looking for tools and parts and the shop charges



the customer \$1.50 per hour, well, the customer simply pays the \$1.50 along with his other charges.

That's where the kicks have come in the past and where they will come so long as our shops are not organized and our mechanics spend much of their time on unproductive work.

Those who seek to install the flat rate system or the piece work plan must first put their houses in order. Frequently we come across dealers and operators of shops who want to install the flat rate system and in many cases these men have the idea that the installation of the system means having a list of the various operations to be performed on cars with a price for the job placed after it.

### Get Organized First

They fail in that they have not first asked themselves, "Are we equipped to operate on the flat rate basis?" All the statistics in the world on the sequence of repair operations and prices will not do any good until a shop first gets properly organized.

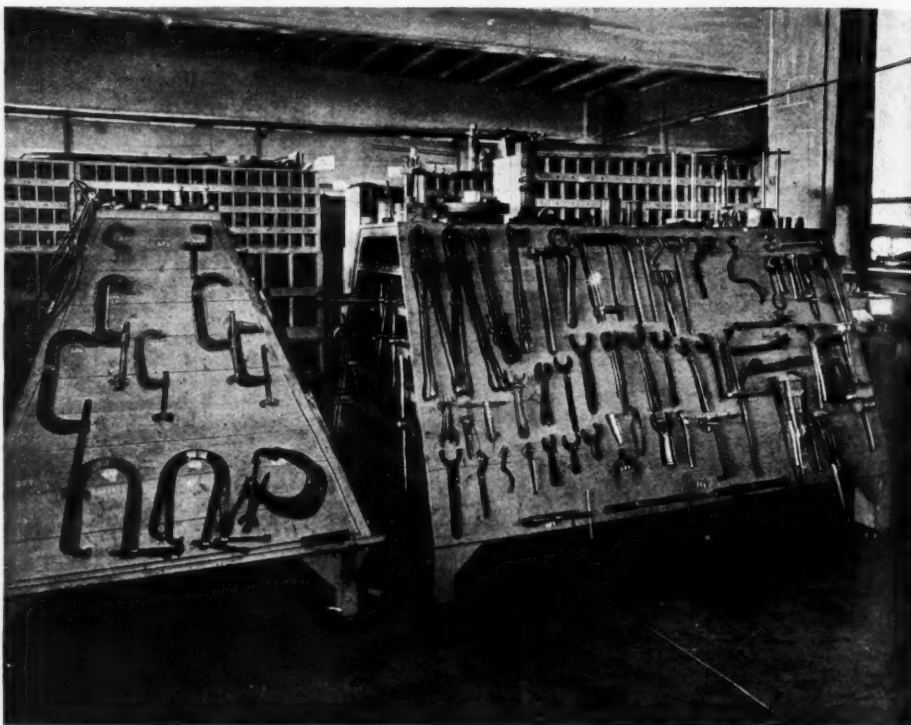
You may have the best intentions in the world and think you are making headway when you set a flat price on a job that has merely been "lifted" from some other establishment, but you may find that your shop is losing money.

Flat rate and piece work must come after you have set your shop in order for them. True, they mean a lot of clerical work and tabulations, but all this means little if you are not set to go ahead right in your shop. No one must expect to intelligently sell maintenance and service if they are not intelligently operating their shop. And by intelligently operating the shop we simply mean doing some of the common things like placing the shop tools on racks, providing enough drop lights for the mechanics, making it easy for the mechanics to get parts quickly from the stock room, keeping the shop clean and orderly and finally, working to a plan.

One of the simplest examples we can cite here of where a man failed to work to a plan occurred recently in a small town service station. A man drove in with his car and after looking around for some one to pay attention to his wants finally got out and walked to the back of the shop and asked a mechanic if he might get his brakes freed up. The lining on the bands had become glazed with the result that the brakes took hold abruptly. Here is what the mechanic did:

First he walked over to the man's car and looked at the brakes. The owner of the car had previously told him that he thought a little kerosene applied to the lining would do the trick, as the car had been driven only 5,000 miles during which period the brakes would not need relining. Anyway, the mechanic looked at the brakes and then walked over to the corner of the shop to get an empty oil can. This he took to another part of the shop and filled with kerosene. Then he walked back to the car and squirted kerosene around the band and drum. He looked at the job for another half minute or so and then concluded that jacking up the wheels would be better.

So, he made another trip to the far corner of the shop for the jack. Then he jacked up the rear of the car and applied

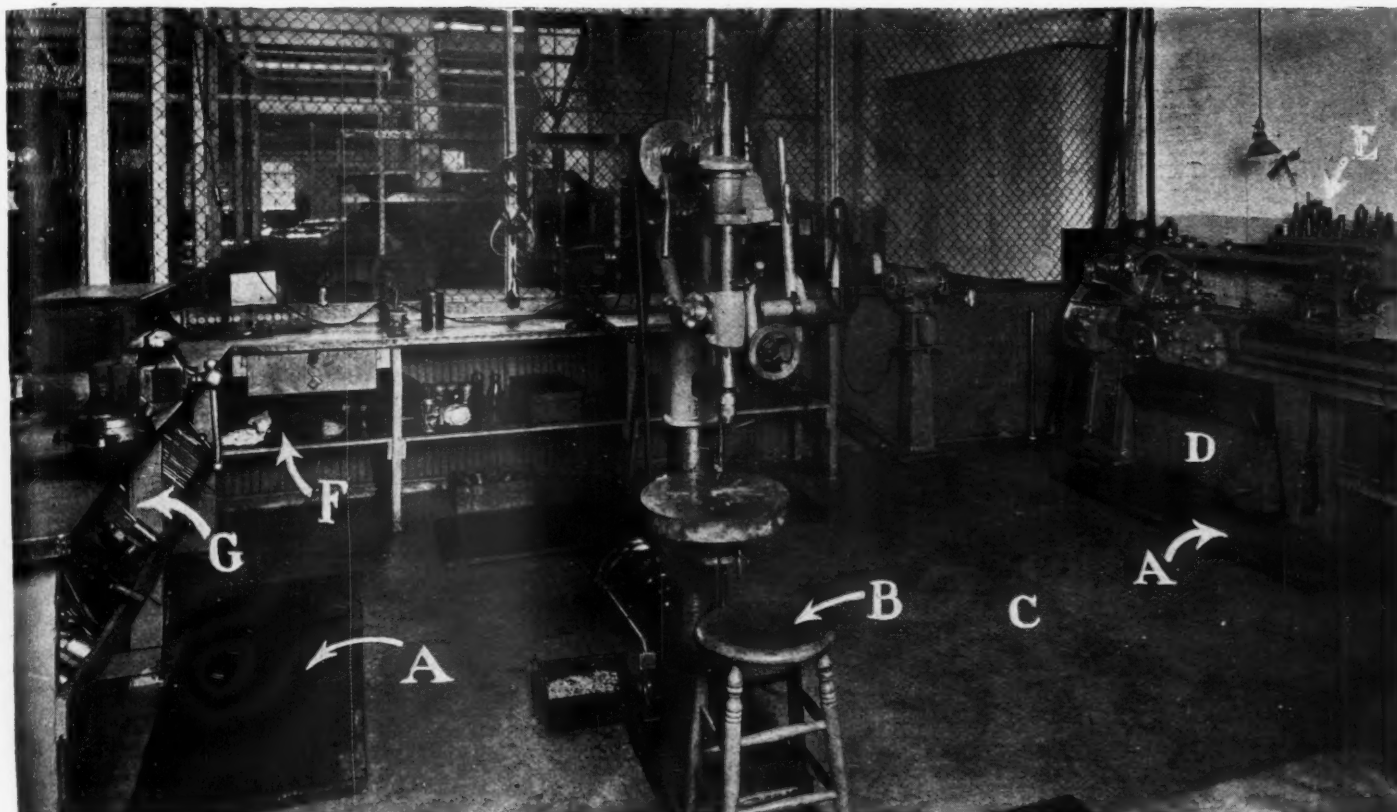


*In this article mention is made of the vast amount of time lost by mechanics getting tools and parts from the stockroom. Here are shown two views taken in two different shops. The one above shows how the shop tools are kept on special racks built for them. When a tool is taken from the rack a painted reproduction of the general shape of the tool on the rack calls attention to the fact. The tools are numbered and little or no time is lost when a mechanic asks for a certain tool*

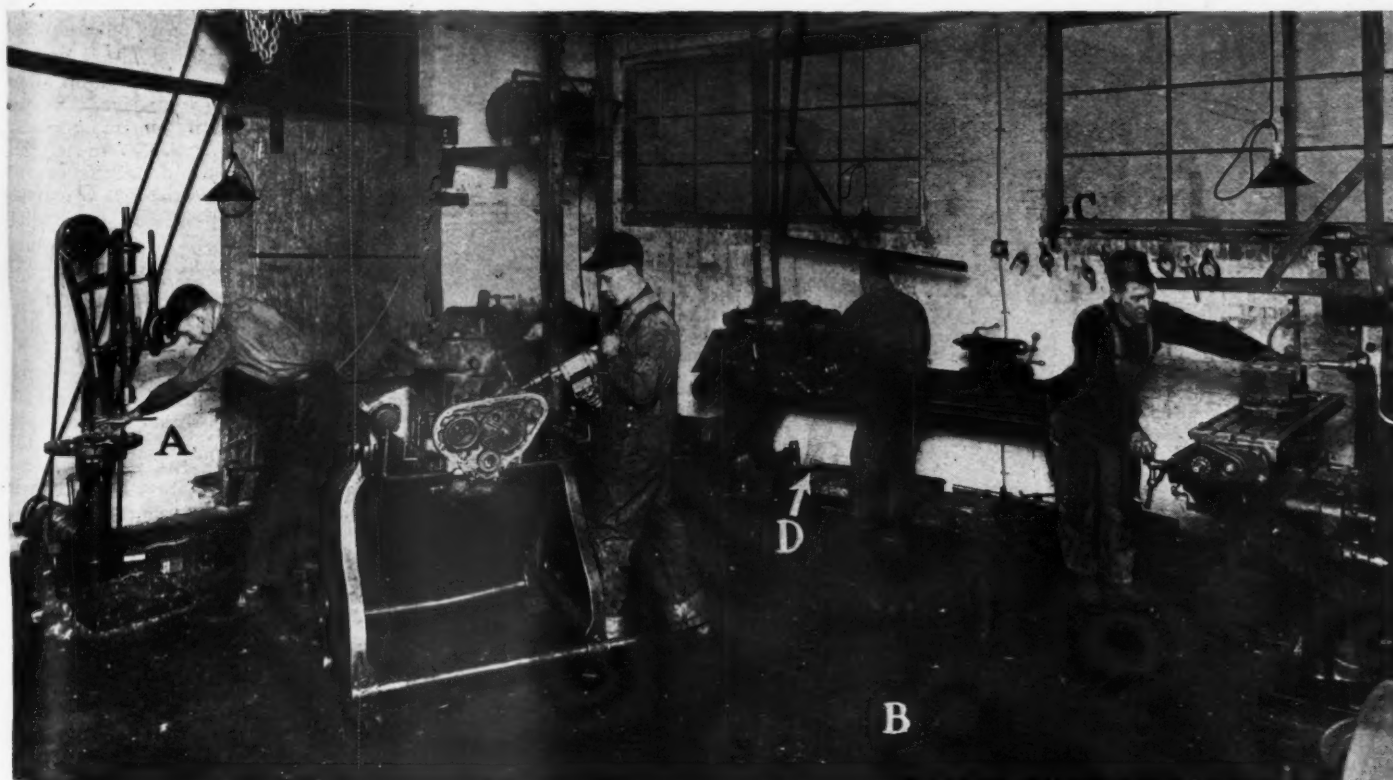
*The orderly arrangement of the tools in the lower view readily is apparent. Also note that there are plenty of one certain kind of tool. For instance, there are six wheel pullers and in this shop there is little chance for mechanics to wander around the shop asking, "Who's got the wheel puller?" Incidentally, note that the floor is unobstructed under the bottom shelf. There are no "junk" parts swept underneath, as is so often the case*

the kerosene to both brakes, spinning the wheels to distribute the kerosene.

He got kerosene on some of the brake levers and joints and concluded that he had better put oil on these. So another trip was made to the bench for the oil can. Then, after all this was done and he removed the jack from under the car the



Here is an example of an excellent shop. One is immediately impressed with the orderly arrangement of things. This shop was not specially prepared for the picture. We have been in it at various times and it always looks the same. It is a paying shop, made possible largely because no time is lost looking for tools and because the working conditions are right. The wood floor mats A, for instance, offer relief to the men from the cement floor. The stool B lets a man sit down to his work at the drill press. Note the clean floor C. Under the lathe at D, is a bin for catching metal shavings and oil. At E note how the lathe tools are kept. There is no collection of junk and floor sweepings under the bench, as will be noted in the spaces F. Tools which belong in the shop are conveniently placed on an inclined rack, shown at G



We do not wish to condemn this shop from the standpoint of equipment, because it is well fitted out with machine tools and capable of handling about every kind of operation which can come into a shop. But we do wish to call attention to the general layout of the place as compared with the shop above. For one thing, note that the man at the drill press A stands in an uncomfortable position. The floor condition at B, is not as good and the haphazard grouping of the lathe tools at C, certainly contrasts with that of E, in the shop above. You will note there is no bin under the lathe at D, as in the above shop. We believe the reader by studying these two shop pictures will get the point we are trying to make, and that is, that your shop must be put in order before you can expect it to pay dividends through the adoption of the flat rate system or piece-work plan of selling maintenance





It took one mechanic something like 31 minutes to procure a complete set of gaskets for an engine, which rather makes us feel that the supply of gaskets in that institution was not kept after the manner shown above. A stock picker, who is informed, ought to know how many and what kind of gaskets form a complete set, and if the supply is kept properly, there should be little time lost in making up a set. He may even go so far as to keep complete sets made up and pass them out to mechanics when the occasion arises. What to do with the oils and greases, especially the waste oil, is often a problem in the shop. Above is a suggestion that has worked out well in one shop. Here the waste oil is poured into a barrel on a movable platform so the barrel can be hauled away and periodically dumped. Above it is a compartment for small hand oilers, measures, etc. The compartment adjacent is used for receiving used waste and rags. Providing for these things insures a clean shop and system

owner reminded him of the fact that a lot of kerosene had run over the wheel spokes and rim. So, another trip was made to the bench for a rag. Finally after wiping the wheels clean the job was ready and the brakes evidently performed all right after that.

The work had been done satisfactorily so far as the softening up of the fabric was concerned, but see how unsystematically the mechanic worked.

What he should have done is to have visualized what the job meant and gone to the car with the jack, the kerosene can, oil can and rag. Certainly he must have performed this operation many times before, as it is a common one, and it is hard to understand why a man does not organize for such a job.

Recently we were given the opportunity of looking over some time study sheets computed in a service department. In checking these over the amazing thing, which immediately becomes apparent, is the fact that much time is lost in picking stock and looking for tools.

For example, in a job calling for the relining of one external brake band, it took 27 minutes to get linings and an anchor bar from the stockroom. The mechanic found while starting to assemble the new anchor bar to the band that the threads were battered, so he went back to the stockroom to exchange it for a good one. Difficulty was experienced in finding a good one and all told 52 min. were consumed.

#### Where Time Is Wasted

Next the mechanic had to hunt for a wrench suitable to take the wheel pulling tool off the wheel, which took 9 minutes. The next delay occurred in looking for a spare cord and light, 5 minutes. A trip outside the service department to a hardware store to purchase rivets took 24 minutes.

All told it required 281 minutes for the entire job. Now, out of this it required 105 minutes for procuring stock and 14 for delays, in looking for tools and other apparatus. Twenty-seven per cent of the time was consumed in procuring stock. It happens that the stockroom in this particular case is located on the second floor and the men have to walk a considerable distance to get parts and material.

But regardless of where the stockroom is located it would seem that a portion of the stock, those things which are in demand most could be carried nearer the service department.

In the above case relining one brake band, it took nine times as long to look for a wrench as it did to use it, inasmuch as it took but one minute to remove the puller after procuring the wrench.

A shop never knows just how time is wasted chasing stock and looking for tools until a careful check-up is made. A job of building up an engine in a service department was checked and here is how some of the time was spent in the performance of non-productive work. (Work, by the way, for which many a customer has been charged in the past on the hourly rate basis).

Getting piston pin reamer and other tools.....20 min.  
Procuring new camshaft gear from stockroom.....15 min.  
Procuring complete set of gaskets

from stockroom .....31 min.  
Turning engine right side up on wood horses.....  
(Three men) 15 min.

It takes but little imagination to see that a shop run on that basis will have pretty tough sledding when it comes to the



establishment of a flat rate system unless, of course, things are materially changed to cut the non-productive work to a minimum.

In one dealer's shop the tool room is located on the shop floor, while the stockroom, on the floor below, is placed at the opposite end of the structure. Naturally there can be no dumb waiter connected with this sort of layout and the result is the mechanics have to walk or take the elevator to the floor below every time they want parts or materials.

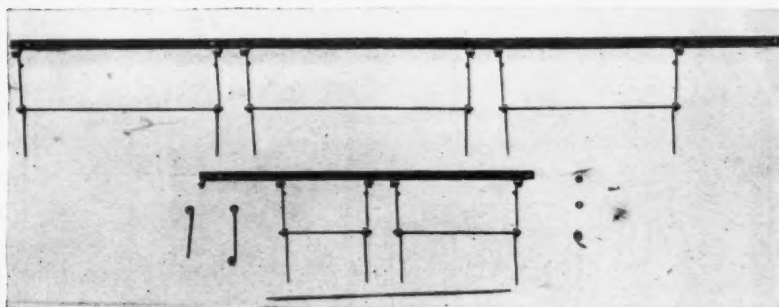
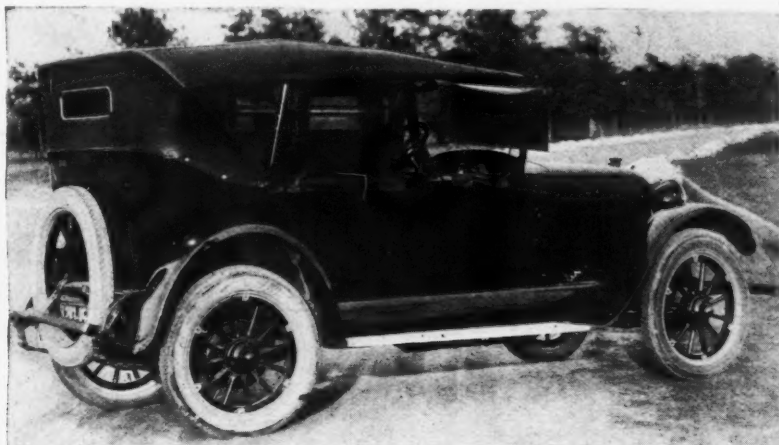
Organizing for the flat rate system means among other things that the tools and parts that are apt to be needed for any certain job will be on hand when the job is started. The flat rate operations always are designated by number, letters or symbols of some kind and it would seem that a mechanic when assigned to any such operations would first make out a requisition for these tools and parts, get the requisition approved by the foreman and then hand them to a boy whose sole duty would be to take care of the mechanics' wants. While the boy was getting the order filled the mechanic could start the preliminary work on the job.

As it is now a mechanic starts the job and hunts for a tool as the need for it arises. Then he makes many trips to the stock room for the parts in the order in which these parts are needed for the job. In other words he covers the same ground many times over to and from the stock room by getting the parts singly; whereas, time would be saved in making the trip but once and then getting all the parts and tools.

Stock rooms are not always as orderly as they might be and the delay many times comes from the inability of the stock room attendants to fill the parts requisitions readily. This calls for a revision of stock room methods, a hint of which was given in the caption under the illustration on the preceding page wherein mention was made of the advisability of making up complete sets of gaskets.

The illustrations in connection with the article ought to be an inspiration to those who seek to install the flat rate system, but who do not as yet fully realize the importance of the great necessity of first putting the shop and stock room in order. When you are set to go ahead right, such things as tool delays and stock procuring delays will become insignificant.

## New Type of Side Curtains Permit Quick Raising and Lowering



Side curtain installation which is being exhibited to manufacturers at the present time. The side curtains fold up inside the top and are accessible for emergency use. Left, top lifted to show method of concealing side curtains beneath liner. Upper right, panel over front door raised to permit entrance through door with Simplex side curtains

THE Simplex Auto Curtain Co. of Detroit is exhibiting to manufacturers and fitting to a number of experimental cars a new type of side curtain assembly designed for quick raising and lowering. With this curtain, the side curtains are permanently connected to a longitudinal piece running along the inside of the top. The side curtains are mounted on hinged frames which fold down from the longitudinal member. These frames are not only fitted with quick acting hinge devices, but are also so designed as to support the celluloid curtains, preventing them from wrinkling or folding, thus prolonging their life.

When not in use, the side curtains are

folded up inside the top and covered by a lining piece which buttons in place. In case of a sudden storm, or if for any reason it is desired to put the side curtains quickly in position, it is only necessary to loosen the liner and pull down the hinged framework supporting the side curtains.

Access through the doors of the cars is secured by lifting the individual side curtain panel, over the door, sufficiently to permit entrance. Another design is being worked out at the present time by means of which the panel adjacent to the door can be opened and closed with the door if so desired.

### FALL SHOW AT COLUMBUS

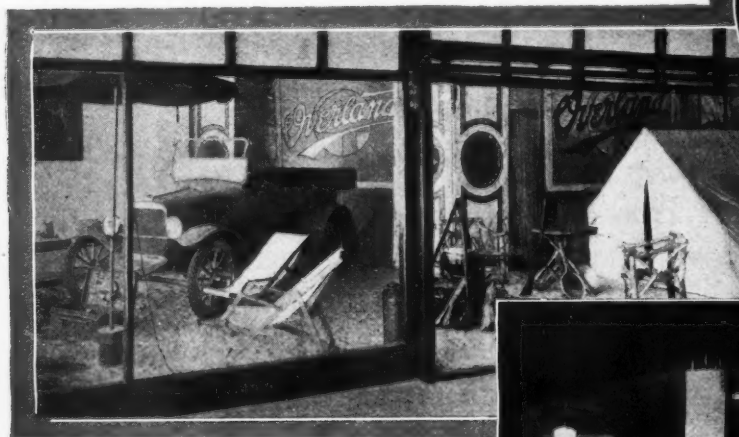
COLUMBUS, O., Sept. 7.—The annual fall automobile show, held under the auspices of the Columbus Automobile Dealers Co., in connection with the Ohio State Fair, was staged Aug. 27 until Sept. 1. This show took up one large building. All models sold in the city were on display, from the Ford to the Packard and Lincoln. The displays were attractively arranged and throngs came to see the latest models.

Sales during the show were in excess of those of previous years. This is especially true of cars selling from \$500 to \$1,500, while a number of sales of higher priced cars were also closed.

## Sales Making and Prize Winning Windows



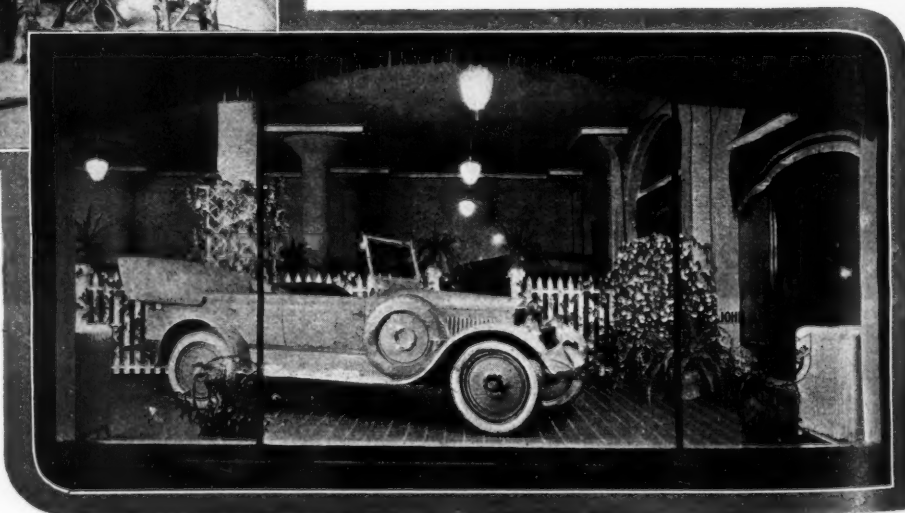
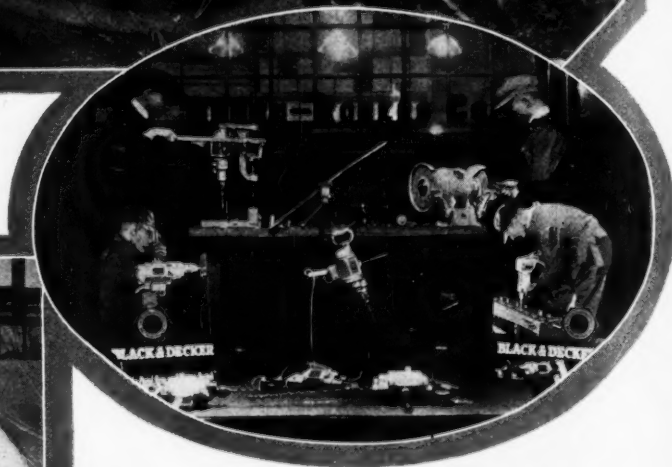
*H. O. Harrison, Hudson Essex distributors in San Francisco, sounded the "Call of the Open Road" to passers-by with this luring mountain camp scene*



*Autocars, Ltd., Willys-Overland dealers at Adelaide, South Australia, also went in for the camping call*

*The Studebaker Big-Six speedster shown in the window, at the right, arranged by the John G. Wollaeger Co., Milwaukee, made an appealingly beautiful display, with its rose bush, its morning glories and crocuses, scrambling in a riot of color over the quaint white fence*

*Brown-Rogers Co., Winston-Salem, N. C., took a prize in the Black & Decker window display contest with the one shown at the right center*





## New Type V-63 Cadillac Featured by Redesigned Engine and Four-Wheel Brakes

*Eleven Different Body Styles Comprise New Line. Radiator Slightly Higher and Hood Longer, Although 132 In. Wheelbase Is Retained. Two Cross Members Added to Frame. Many Refinements in Both Open and Closed Models*

A COMPLETELY redesigned engine and four wheel brakes distinguish the new type V-63 Cadillac from its predecessor, the 61. Besides these two major chassis changes there is an entirely new line of bodies comprising eleven different types. The bodies have been improved by providing more leg room, side room and head room both in the front and rear compartments. The radiator is 1 in. higher and the hood slightly longer, resulting, with the new body lines, in making the car appear lower and longer, although the 132 in. wheelbase remains unchanged.

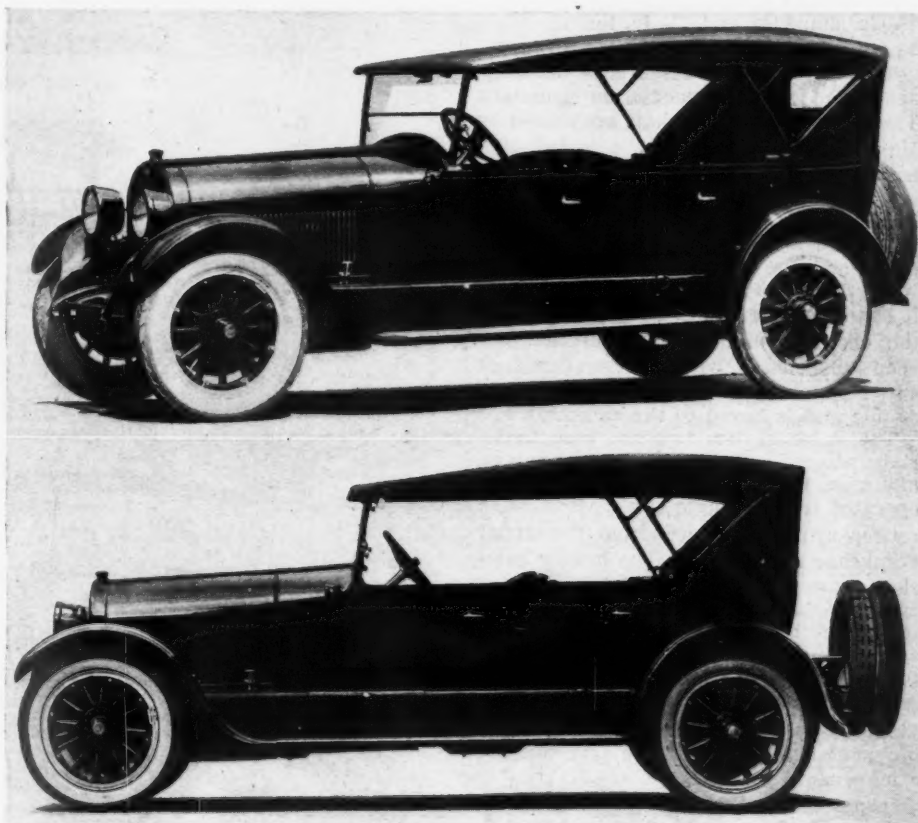
The appearance is further improved by the new nickel and Bakelite radiator cap, and a new design of head and side lamps. The head lamps are more nearly cylindrical in shape and the side lamps are of the bullet type. The fenders on the new model are a new design made of heavier steel and the edging continues into the black enamel edge of the running board to give the fenders the appearance of running the complete length of the car. A slight increase in price will be made throughout the line.

### Many Engine Changes

With the exception of the bore and stroke, which remains  $3\frac{1}{8}$  by  $5\frac{1}{8}$  in., practically every important dimension of the engine has been altered. Following previous practice, the cylinders are cast in blocks of four placed at an angle of 90 deg. to each other, with the cylinders directly opposite. The changes in the engine result largely from the new crankshaft which differs from the preceding type in two important respects. First, the arrangement of the crank throws and second, the use of compensators or counterweights. The new crankshaft has four crank throws in two planes at right angles to each other instead of all in one plane.

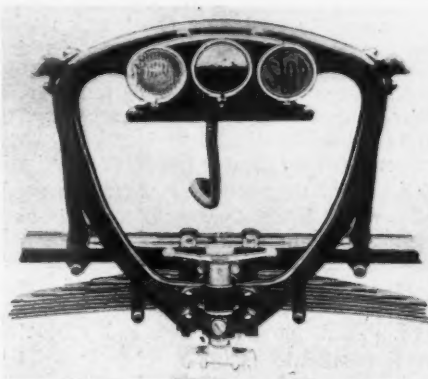
The rearrangement of the crankshaft throws combined with the counterweights has resulted, according to the Cadillac engineers, in putting the engine in inherent balance. According to the previously accepted theories, the 90 deg. V engine was necessarily subject to what have been termed cross vibrations, resulting from rocking couples caused by the shifting of the centers of gravity of the reciprocating masses in the two blocks of four. It is claimed that the new crankshaft eliminates these rocking couples both according to mathematical demonstration and by actual driving experience, making an engine which is not only in inherent but in practical balance.

The firing interval is not changed by the rearrangement of the crank throws, although the firing order has been al-



Two of the opened models of the new V-63 Cadillac. At the top is the seven-passenger and below the four-passenger phaeton. The body lines are practically the same as formerly, although the radiator is one inch higher

tered. The power impulses occur 90 deg. apart, in accordance with the characteristics of a 90 deg. cylinder angle the same as on previous Cadillacs. The firing order, as will be explained, however, is entirely different.



The Cadillac triple rear light combination and new tire carrier. The white light automatically lights at night when the car is reversed

The new crankshaft has been designed to permit the reciprocating inertia forces in the two blocks of four, which are responsible for the cross vibrations, to completely cancel out. Some idea of the fundamental principles of the new crankshaft however, may be gained from the explanation that the new firing order causes the eight cylinder engine to act as four two-cylinder engines rather than as two four cylinder engines.

In other words, by placing the crankshaft throws in two planes at right angles to each other the component inertia forces are divided into pairs of forces which are equal and opposite, although not in the same plane. The effect of these forces is then neutralized by the compensators. The weights of the compensators and the angles at which they are placed are so calculated that their centrifugal effect is designed to cause the whole assembly, including crankshaft, connecting rods and pistons, to operate in dynamic balance.

The crankshaft is supported on three main bearings as formerly. The bearing



stresses on the new model however, are lighter, not only because of the reduced vibration, but also because the crankshaft on the new model is  $2\frac{3}{4}$  in. in diameter whereas it was 2 in. The bearing lengths on the previous model were  $3\frac{1}{4}$ ,  $2\frac{1}{2}$ , and  $4\frac{1}{8}$  in. front, center and rear and on the new model they are respectively  $2\frac{3}{4}$ ,  $2\frac{3}{4}$  and  $4\frac{1}{8}$  in. A somewhat lighter flywheel is used because of the flywheel effect of the compensators and the larger crankshaft. The connecting rod bearings on type 61 were  $1\frac{1}{8}$  in. diameter and  $2\frac{3}{4}$  in. long. They are now  $2\frac{3}{8}$  in. diameter and  $2\frac{3}{4}$  in. long.

#### Timing Chain Adjustment Discontinued

The valve drive is essentially the same as in the previous model, in principle. The camshaft and fan shaft are driven by Morse silent chain, but the installation has been improved by using the latest type of Morse chain and also increasing the chain  $\frac{1}{4}$  of an inch in width. With the better wearing qualities of the new chain and the increased width, together with the smoother crankshaft rotation, it has been found that an adjustment on the chain is unnecessary and this has been dispensed with. The camshaft sprocket is now a single type instead of double and is keyed to the camshaft.

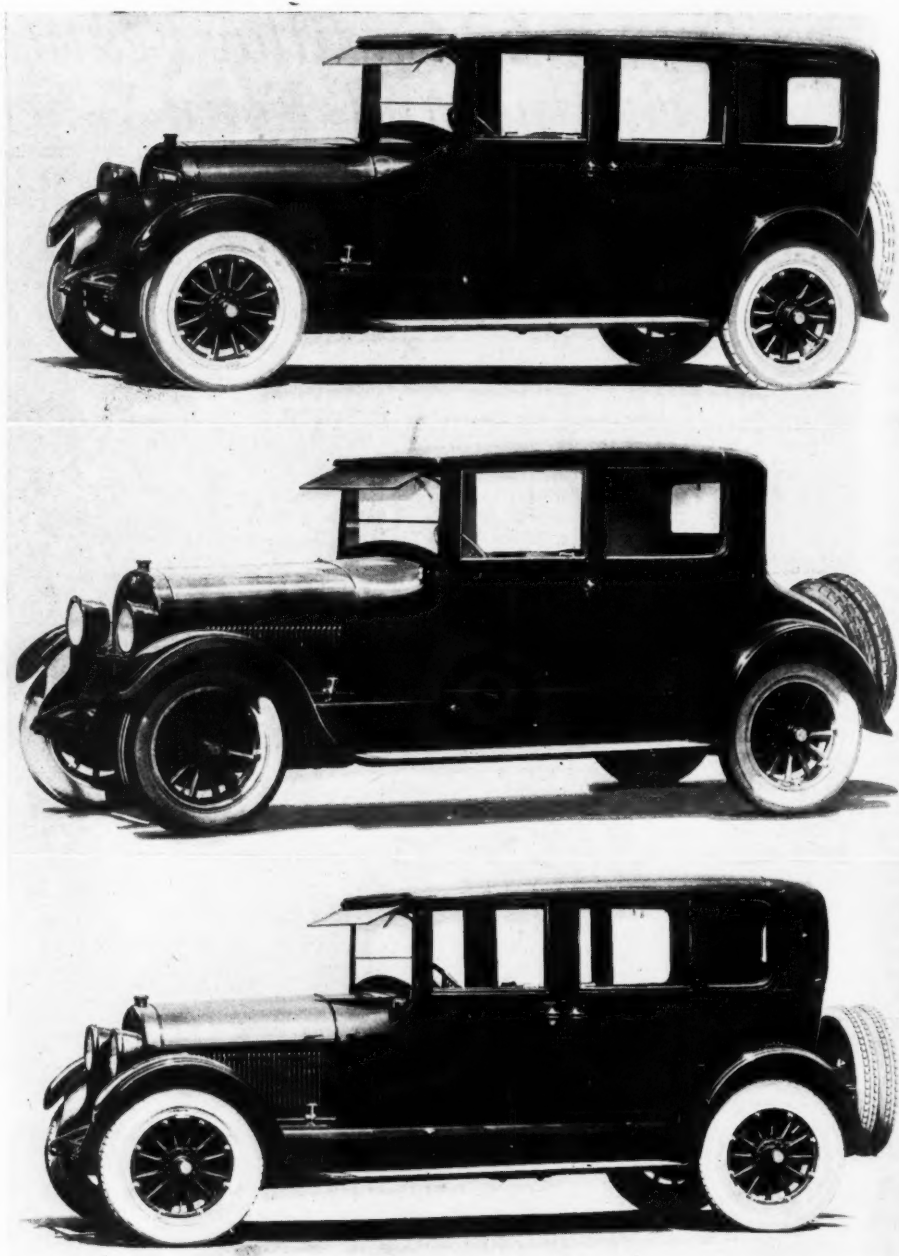
The valve system has not been materially altered. The tungsten steel valves, giving a  $1\frac{1}{8}$  in. diameter opening, are operated from a single camshaft through rocker arms suspended from the upper crankcase cover plate. The hollow camshaft however, now has 16 instead of 8 cams, each valve being operated by an individual cam. The valve rocker arm and plate assembly has been redesigned to conform with the new camshaft. Additional supports are provided for the rocker arm shaft so there is a support on each side of each rocker arm, making a more rigid assembly.

#### Unusual Firing Order

The new firing order is 1-L, 4-R, 4-L, 2-L, 3-R, 3-L, 2-R, 1-R. On the type 61 the firing order was 1-L, 2-R, 3-L, 1-R, 4-L, 3-R, 2-L, 4-R. The valve timing remains the same, the exhaust opening at 46 deg. 40 min. ahead of lower center and closing on upper center. The intake opens at upper dead center and closes 46 deg. 40 min. after bottom center.

The fuel and carburetion system is practically the same as on the previous model. Pressure feed is continued from the 20 gal. gasoline tank. The tank itself has been improved in two details. The quantity gage is placed in a more convenient location at the left end of the tank. The gasoline and air connections are in more accessible positions on the front side of the tank with ample clearance below the frame cross member.

The carburetor is the same as previously used with a slight improvement in accessibility by using a single drain pipe, passing between the two center cylinders on the right side, instead of the multiple drain pipe previously used. This renders the valve adjustment more accessible. The exhaust heated intake manifold is used as formerly, but the flanges for the connections to the cylinder block are placed parallel to the cylinders instead of vertical. This makes unnecessary any springing of the mani-



Three Cadillac closed model cars. At the top is the seven-passenger sedan, center four-passenger coupe, and below the five-passenger sedan

fold in removing and installing and insures tight joints.

The ignition system is the Cadillac Delco type continued for its eighth year. The conduits enclosing the ignition wiring are now supported on bosses cast for that purpose on the blocks instead of on brackets fastened to the cylinder head nuts. This renders it unnecessary to disturb the ignition wiring conduits when removing the cylinder head. A new ignition coil of the transformer type is used, giving higher efficiency. The coil is now completely enclosed in molded Bakelite, making it weatherproof. The high tension terminal has been removed from the side of the coil toward the front seat and placed above the coil and protected by the Bakelite casing.

#### New Condenser Arrangement

The cooling system remains the same with minor improvements. The radiator condenser is located further toward the rear and suspended in a vertical position

so that the incoming vapor will pass through a greater depth of liquid. Necessity for filling the condenser through the floor boards has been eliminated, the operation being automatic, as the water which flows into the overflow pipe on filling the radiator enters the condenser. The two centrifugal water circulating pumps are driven by a spiral gear from the crankshaft and contain thermostatically controlled valves as formerly.

Lubrication of the new engine is the same as the previous type, but a larger and more convenient oil filler is provided, bringing the opening above the hose connection between the radiator and the engine. The oil filler is provided with a hinged instead of a threaded cap and has a large strainer. The oil level indicator has been improved by eliminating the glass and thus insuring the permanent visibility of the indicator ball.

The other power transmission units have not been altered. The clutch,

transmission gearset, propeller shaft, etc., remain practically the same. A minor change has been incorporated in the gearset to provide for the operation of the backup light switch when the transmission control lever is put in reverse position. The transmission gear tooth surfaces, which engage in intermediate gear and direct drive, are finished by a grinding process for quietness. The rear axle is practically the same as that used on the later type 61 cars.

#### Two Cross Members Added

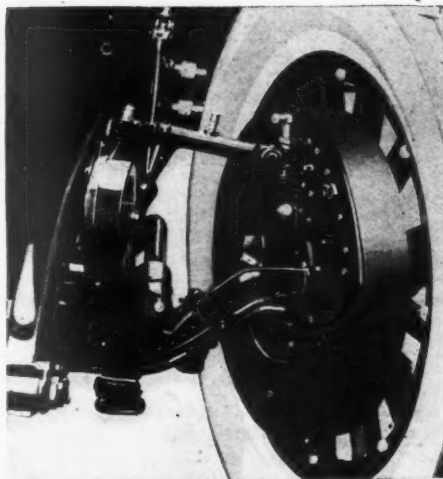
The frame for the new car is more rigid than its predecessor. The side bars have the same dimensions as the previous model, but two new cross-members have been added. One of these, tubular in form, is placed a short distance behind the gearset. The other is a cross-member of channel section located directly opposite the front ends of the rear springs. The artillery type wheels, with steel felloes and twelve hickory spokes, are similar to those on the previous model. The steering gear has been changed in detail to give a slightly increased ratio between the steering wheel and the sector shaft for easier steering.

Another minor improvement has been made at the upper end of the steering column where an adjustable packing gland has been placed to prevent the overflow of lubricant when too much has been injected. The oil hole for lubricating the bushing at the upper end of the column has been relocated, enlarged and provided with a plug.

The front axle has been entirely redesigned and strengthened to provide for the additional stresses imposed by the front wheel brakes. It is a reverse Elliott type. The steering cross-arm is behind the front axle and the connections at the ends of the cross-arms are ball and socket type to take care of any vertical component induced by the fact that the steering spindle bolts are now inclined at an angle which brings the point of contact between the tire and road nearer the pivot action.

#### Perrot Type Brakes

The Cadillac four wheel brake arrangement is an adaptation of the Perrot system as used on other General Motors cars. The layout however, is somewhat different as regards the distribution of



The front wheel brake construction of the new Cadillac V-63. This brake is of the external expanding type

braking effect between the front and rear brakes. The braking system consists of three pairs of brakes. The service brakes which operate on all four wheels simultaneously are external on the rear wheels and internal on the front. The emergency or hand brakes are external on the rear wheels. The hand brakes are independent of the foot brakes in all particulars.

The four wheel brakes are so designed that when the brakes are applied with the steering wheel turned to the right or left, only the brake on the inner wheel will take effect, leaving the outer front wheel free to rotate. Similarly, if the car is sliding straight ahead on a slippery surface with both front wheels locked, and if the steering wheel is then turned, the outside front brake will automatically release. The braking effect is so proportioned between the front and rear wheels that the front wheels will not lock until more than enough pressure has been applied to lock the rear wheels. The proportion of the braking effect taken by the front wheels can be adjusted, within limits, to meet the requirements of different loads or to suit individual preference.

#### Drum Expansion Has Equalizing Effect

It is claimed that the use of the internal brakes on the front wheels also produces an automatic thermal equalizing

effect which is sufficient, when the car is traveling straight ahead, to correct any slight inequalities which might exist in the adjustment of the front wheel brakes. If one front wheel brake has slightly less clearance than the other and takes effect first, the friction, it is claimed, will heat and expand the corresponding brake drum. The expansion of the drum will increase the clearance slightly and permit the pedal to be depressed further until the other brake takes effect.

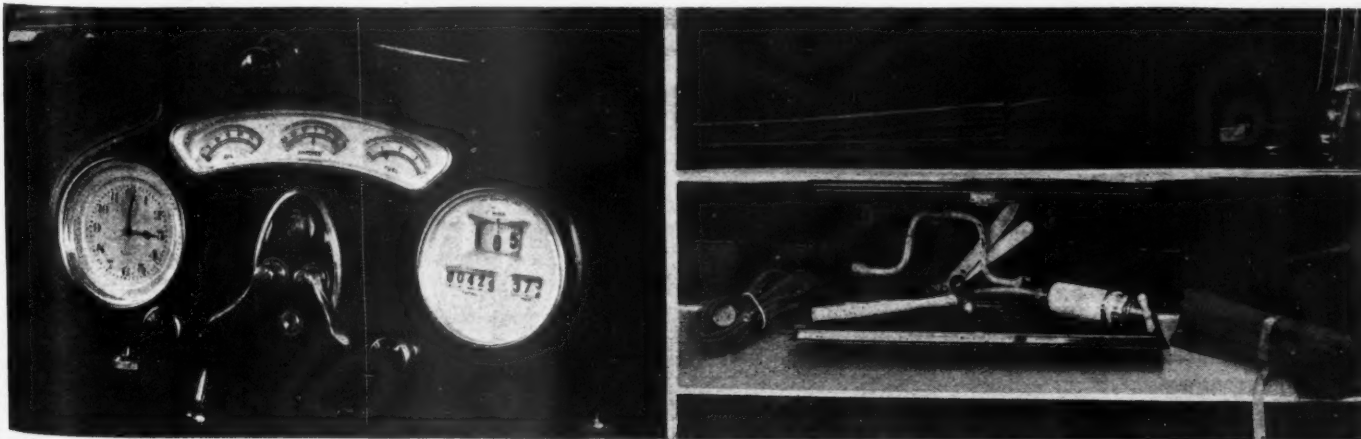
The expansion of the drums renders the rear brakes more and the front brakes less effective, because they are of the external and internal types respectively.

The four wheel brakes are applied by the pedal through pull rods which first pass from the pedal to a division bar, which performs the function of proportioning the travel of the front and rear brake actuating members, thus graduating the braking effect of the front and rear brakes. The division bar is connected by levers to the front and rear cross-shafts which are in turn connected, through levers and pull rods, to the front and rear brakes.

The pull rod connecting the brake pedal to the division bar has two engaging eyes the second of which increases the effective travel of the brake pedal after it has gone to the limit of the first eye and the second eye comes into operation. The first eye is nearer the pedal shaft and consequently has a greater leverage than the second. The connections are so adjusted that during the first part of the pedal travel the brakes are applied through the connection nearest the pedal shaft, giving application of the brakes with light foot pressure. When the brake lining is worn so that the pedal is within short distance of the toe board, the upper connection takes effect and the rate of pedal travel is reduced.

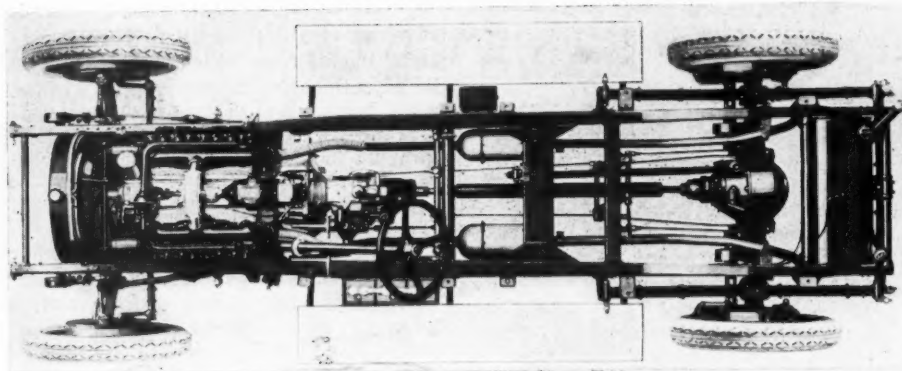
The result of this two-stage construction is that the brakes can be used for a much longer time before the pedal touches the toe board and the adjustments are more infrequent. At the same time, the change in leverage denotes to the driver that the second stage has been reached and that adjustments must be made in the near future.

In addition to making the pedal travel



To the left is shown the new layout of the instruments on the new Cadillac, while at the right is shown the tool box, set in the running board splashers on the right hand side of the car. The larger tools are detained by clips





*Airplane view of Cadillac chassis Model V63. The platform type rear springs are retained. The steering cross rod is now placed behind the front axle*

as effective as possible, a special type of brake lining, which is highly compressed and subjected during manufacture to a heat treatment, has been adopted. Before assembling the brake band on the axle, the lining is machine burnished to take off the surface bloom and consequently give a longer wear before adjustment is necessary. All four brake drums are the same size, 17 in. in diameter. The three sets of brakes are the flexible band type designed to permit the lining to conform to any slight distortion of the drums resulting from heat.

#### Front Brakes Are Internal

The front internal brakes are of the expanding toggle type, similar in principle to previous rear wheel internal brakes but differing in the method of application. As in the internal brakes, the location of the anchor in relation to the toggle makes use of the wrapping action. Provision has been made for protecting the front wheel brakes from the weather. The brake drum overlaps the edge of the dust shield in an angle shaped projection to automatically catch and throw off any water or dirt which may pass the dust shield.

The disengaging effect on the front wheel brakes, secured on the outer wheel in steering, is due to the fact that the vertical pin in the universal joint, at the outer end of the front brake shaft, has an axis which is perpendicular while the king pin, about which the wheel turns in steering, is so inclined that if produced it nearly meets the central point of contact between tire and ground. This lack of parallelism in the axes produces a relative movement when the wheel is turned and partially disengages the brake on the outside wheel in rounding a curve.

The equalizer for the rear wheel brake is suspended from the frame cross-member opposite the front end of the rear springs.

#### Eleven Body Styles

Eleven body styles, all of which are new but similar in general characteristics to previous Cadillac bodies, have been designed for the type 63 chassis. Generally, the bodies afford more leg room, side room and head room, both in the open and closed models. In the closed bodies, a particular improvement is in the front door post which is of special design to permit greater vision for the driver. Another new feature on

the closed bodies is the two-piece ventilating windshield which also affords better vision than the previous model. The division between the front and rear compartments of the chauffeur driven cars, the Imperial suburban, Imperial sedan, open limousine, and town brougham now extends across the full width of the car and allows for the lowering of the special curved glass.

The plate glass in all closed bodies is 7/32 in. thick and of mirror finish. All of the doors are flush type and butt-walnut veneer panels in matched sets are used on the inside of the doors. The walnut molding, mohair finishings trimmed in panel effect and tufted pockets are features of the doors in the closed bodies of the entire line.

The window lift handles on the front doors are now located so that they do not interfere with the driver's hands while he is operating the car. Silk roller curtains are now carried on the body header above the doors rather than on the doors themselves. The rear seats of the closed models have been improved for riding qualities by making them more nearly the lounge type, and the horizontal cushion is made to fit underneath the back springs in such a way that it causes

the shape of the back and the seat to conform more naturally with the occupants' position.

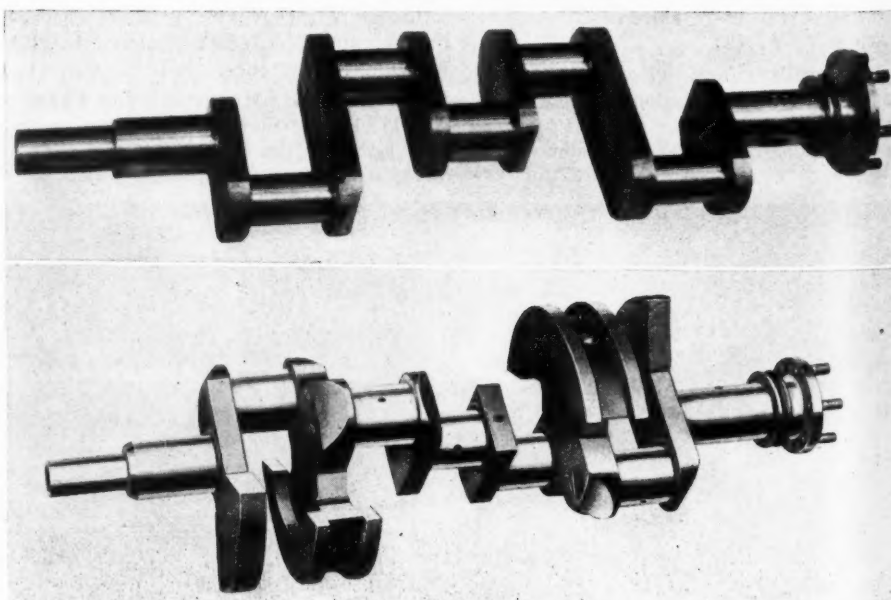
There is also a rubber padded arm rest for the occupants of the rear seat. The roof is soft, slat construction to deaden sound. The upholstery and interior trimmings are a new line of velvet mohair made from the first carding of goat hair. In the Imperial suburban, open limousine and town brougham, an additional eight-day clock is mounted above the division window for the rear seat passengers.

The closed body line consists of a two-passenger coupe, five-passenger coupe, Imperial sedan, seven-passenger suburban, Imperial suburban, open limousine and town brougham. The open bodies consist of the roadster, phaeton and touring car.

Nineteen gage steel is used in constructing the doors of all the open models. The doors are opened and shut from the inside by flush type handles.

The tonneau floor is constructed to reinforce the entire rear end of the body and the front seat construction is more rigid. Pivot pins in the auxiliary seat are designed to take up all play in the auxiliary seats and brackets to prevent rattles. A large tool box, built in the right hand dust shield, contains all the hand tools in a separate compartment while the larger tools and equipment are held in place by spring clips.

In the roadster, two extra passengers may be accommodated in the cushion-back auxiliary seat placed beneath the rear deck. There is a combination door and step on the right side of the car which opens into a compartment where golf bags, week-end bag or small parcels may be carried. When opened, this door serves as a step to assist the occupants of the deck seat in entering the car. The phaeton now has a new trunk support fastened with concealed screws and in the touring car the rear seat has been widened 1 in., making it 46 in.



*Above is shown the crankshaft formerly used by Cadillac, while below is the shaft in the new model. The peculiar position of the throws will be noticed. These are 90 degrees apart. The effect of this construction is to eliminate cross vibration in the engine, and the latter operates more nearly like four 2-cylinder engines rather than two 4-cylinder engines*



# Can the Small Dealer Afford to Pass Up Flat Rate?

*There Must Be Something Wrong With the Hourly System If the Revenue From 2 Mechanics' Salaries Is Not Sufficient to Pay a Fair Salary to the Proprietor*

By PAUL DUMAS

Preceding articles in this series were published on June 21, July 12, August 2 and August 23, 1923.

"WELL that idea may work out in the big shops but it's the bunk out here in the sticks," the speaker was a typical old school combination of chief mechanic, inspector, electrician, bookkeeper, and proprietor all in one. He, like several others of his type, conducts the "One and Helper" garage, charges seventy-five cents per hour for ALL labor and swears that if "He wasn't making money he wouldn't be in business."

Yes, he admits he is "making money," but the term is so flexible that it does not give anywhere near an accurate idea of his financial status. Nine times out of ten an interview with this class of garageman will, if the interviewer gets under his skin, bring to light the story of another maintenance dealer who is just "getting by." Although they sometimes make wages they do not get returns on the money invested in the business and if they stop to figure their "wages" they usually find that for hours put in on the job they are no better off than a fairly paid workman. Compared to the druggist across the street, their profit on the investment is nothing, and those among them who ever take a vacation are few and far between.

Such is the status of a much too large group of small town maintenance dealers. This article is not intended as a condemnation of all GENERAL REPAIR SHOPS or ALL SMALL TOWN MAINTENANCE ESTABLISHMENTS because some of the best, and when we say best, we also mean profitable establishments, are General Repair shops or Official Maintenance Institutions operated by small town dealers.

We do believe, however, that there is HANDWRITING on the wall for some and that within the next five years the effects of Flat Rate will force on to the two types of establishments one or the other of two conditions, BETTER BUSINESS METHODS, or FAILURE. Flat Rate is not generally well understood by many small town dealers and it is because of this lack of understanding that this system, particularly valuable to the small shop, hasn't had the wide application which it will have in the near future.

The advantage of Flat Rate to the metropolitan maintenance establishment is so generally recognized that it is useless to attempt a defense for the old-fashioned TIME AND MATERIAL system. If the above statement were not true it is certain that 14 car manufacturers, representing cars sold under 18 different names, would not compile Flat Rate schedules for the servicing and

maintaining of their products. In addition it should be remembered that the greater part of these schedules were made up from sensible time studies in the maintenance establishments of the authorized dealers.

If we recognize the effectiveness of Flat Rate for the large dealer, and we believe that every straight thinking maintenance dealer will, we must by the same "thinking process" admit that it is an efficient system for the small establishment. The things that make the dividing line between what we call a large maintenance depot and what we call the small shop are well compensated for with Flat rate and where the one has a seeming advantage the other has a distinct and different advantage. Advantages and disadvantages are pretty well balanced among the two sizes of establishments but there are certain conditions where the small town institution has things in its favor that are practically impossible of attainment for the large institution.

Let us consider some of the apparent and PRACTICAL features of the Flat Rate for the small town dealer as compared to the large.

## LOWER OVERHEAD.

A COMPARATIVELY BIGGER MARKET FOR MAINTENANCE MERCHANDISE.

MORE PERSONAL CONTACT WITH CUSTOMER AND PERSONNEL.

Taken in the order as they are listed it can be said without fear of contradiction that the Overhead items of Rent, Light, Heat, Power and Labor cost less in the town than in the large cities. Under the Time system, the average small town Maintenance Merchant sells at an hourly price that varies between 75 cents and one dollar. At this price the percentage of profit per hour labor just about equals the profit derived in the larger city institution operating on the Time system at \$1.25 to \$1.50 per hour.

In either case, it requires very careful management for either of these establishments to conduct the business in such a way as to show a reasonable yearly profit on the investment. When labor is sold on a strictly hourly basis, the natural tendency is to put in as much time as the job will stand. This explains the logic of the maintenance dealer who figures that the use of shop equipment is useless extravagance. Why pay good money for something that reduces the time and that can be spent on a repair job.

Now to get back to Overhead, keep in mind the fact that under the Time system PROFIT is directly dependent on

the number of hours and not on the number of repairs sold. Now there is no good reason why the SELLING PRICE OF A REPAIR JOB ON A MOTOR VEHICLE SHOULD, WITHIN A REASONABLE VARIATION BE ANY MORE IN CHICAGO THAN IN POINT ISABEL, IND. The price of resoling a pair of shoes, of pressing a gentleman's suit of clothes, of a gold tooth, is substantially the same in Point Isabel as it is in Chicago.

With the exception of localities situated on opposite sides of the Rockies it will be found that the selling price of MAINTENANCE on standard commodities, with the exception of automotive maintenance, varies less than a maximum of 15 per cent, between the large city and the country town. The trouble is that the small town establishment, when selling repairs on the hourly basis at current small town prices, is working on too small a margin.

It is a more or less ticklish job to raise the hourly rate in a town where all the other shops are operating on the dollar per hour basis, but, if the small town dealer can sell the REPAIR JOBS at a fixed figure he can incorporate such a raise or increase in his selling price without the resistance attendant to raising the hourly rate under the TIME system. For instance, if the small town merchant sells his maintenance for 15 per cent less than the city price for the same job he still has an extra 18 per cent margin to take care of his profit. In other words if labor sells for \$1 an hour in Point Isabel and \$1.50 in Chicago we have a 33 per cent variation.

Now if a repair job is sold at a FIXED PRICE in Point Isabel at a figure 15 per cent lower than in Chicago there still remains an additional 18 per cent that should be more than sufficient to compensate for the difference in efficiency of the maintenance organizations, the small and the large.

There is such a FIXED PRICED system of merchandising maintenance and it is called FLAT rate. THE FLAT RATE SCHEDULES THAT ARE BEING USED SUCCESSFULLY ARE BASED ON A MINIMUM HOURLY RATE OF \$1.25, and even where the Flat Rate is computed on an hour rate of \$2 per hour there has been a reduction in the cost of maintenance for the car owner and a bigger profit for the dealer.

As an example of how the lower overhead of the small town maintenance depot can be turned into greater profit let us take the case of Operation No. 7 on the Runwell Six. This operation calls

(Continued on page 22)

## Flat Rate Schedules—Chassis Section—Brakes

Operation Schedule No. 5—previous schedules covered; 1—Grind valves, clean carbon and time engine; 2—Renew and adjust connecting rod bearings; 4—Renew and adjust main bearings.

### DODGE—All Models

Operation	CHASSIS SECTION—BRAKES			Parts Prices
	Max. Time	Labor Charges	Total Charge	
Operation No. 50				
				RELINE AND ADJUST OUTER AND INNER BRAKES (Right and Left). Includes the removal and installation of the right and left rear wheels. Reline inner brake shoes and outer bands. Adjust inner and outer brakes.
				MATERIAL Inner and outer brake lining. Rivets. Wing nuts.
	7 hrs.			
Operation No. 51				RELINE AND ADJUST OUTER BRAKE BANDS ONLY (Right and Left). MATERIAL Brake lining. Rivets.
	5 hrs.			
Operation No. 52				RELINE AND ADJUST INNER BRAKE SHOES ONLY (Right and Left). MATERIAL Same as for No. 51.
	4 hrs.			
Operation No. 53				FREE UP ONE BRAKE OPERATING SHAFT. Each
	1½ hrs.			

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION NO. 53 OR SPECIAL SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

### DORT—4-Cylinder Models

Operation	CHASSIS SECTION—BRAKES			Parts Prices
	Max. Time	Labor Charges	Total Charge	
Operation No. 50				RELINE AND ADJUST OUTER AND INNER BRAKES (Right and Left). MATERIAL Same as Dodge.
	5½ hrs.			
Operation No. 51				RELINE AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL Same as Dodge.
	3½ hrs.			
Operation No. 52				RELINE AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL Same as Dodge.
	3½ hrs.			
Operation No. 53				FREE UP AND ADJUST ALL BRAKE RODS AND SHAFTS. MATERIAL None.
	3 hrs.			
Operation No. 54				EQUALIZE AND ADJUST INNER BRAKES ONLY (Right and Left). Includes removing rear wheels. MATERIAL None.
	2 hrs.			
Operation No. 55				EQUALIZE AND ADJUST OUTER BRAKES ONLY. MATERIAL None.
	2 hrs.			

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION NO. 53 OR SPECIAL SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

### OVERLAND—Model 91 and Later

Operation	CHASSIS SECTION—BRAKES			Parts Prices
	Max. Time	Labor Charges	Total Charge	
Operation No. 50				RELINE AND ADJUST OUTER AND INNER BRAKES (Right and Left). MATERIAL Same as Dodge.
	5 hrs.			
Operation No. 51				RELINE AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL Same as Dodge.
	3 hrs.			
Operation No. 52				RELINE AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL Same as Dodge.
	3½ hrs.			
Operation No. 53				FREE UP AND ADJUST ALL BRAKE RODS AND SHAFTS. MATERIAL None.
	3 hrs.			
Operation No. 54				EQUALIZE AND ADJUST INNER BRAKES (Right and Left). Includes removing rear wheels.
	1½ hrs.			
Operation No. 55				EQUALIZE AND ADJUST OUTER BRAKES.
	¾ hr.			

### HUDSON SUPER SIX AND ESSEX

Operation	CHASSIS SECTION—BRAKES			Parts Prices
	Max. Time	Labor Charges	Total Charge	
Operation No. 50				RELINE AND ADJUST OUTER AND INNER BRAKES (Right and Left). Includes adjusting end play in axle shafts if necessary. HUDSON ESSEX
	7½ hrs.			
Operation No. 51				RELINE AND ADJUST OUTER BRAKES ONLY (Right and Left). Includes adjusting end play in axle shafts if necessary. HUDSON ESSEX
	7½ hrs.			
Operation No. 52				RELINE AND ADJUST INNER BRAKES ONLY (Right and Left). Includes adjusting end play in axle shafts if necessary. HUDSON ESSEX
	4½ hrs.			
Operation No. 53				FREE UP AND ADJUST ALL BRAKE RODS AND SHAFTS ONLY. HUDSON ESSEX
	4 hrs.			
Operation No. 55				EQUALIZE AND ADJUST OUTER BRAKES ONLY (Right and Left). HUDSON ESSEX
	2 hrs.			
Operation No. 56				EQUALIZE AND ADJUST INNER AND OUTER BRAKES. HUDSON ESSEX
	1 hr.			
	2½ hrs.			

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION NO. 53 OR SPECIAL SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.



## MAXWELL—After No. 193501

Operation	Max. Time	Labor Charges	Total Charge	Parts Prices	Max. Time	Labor Charges	Total Charge
Operation No. 50	6 hrs.			RELINING AND ADJUST INNER AND OUTER BRAKES (Right and Left). MATERIAL	12 hrs.		\$27.00
Operation No. 51	4 hrs.			Same as Dodge. RELINING AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL			
Operation No. 52	3 hrs.			Same as Dodge. RELINING AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL			
Operation No. 52TM	1½ hrs.			Same as Dodge. RELINING AND ADJUST EMERGENCY BRAKE ON TRANSMISSION. MATERIAL	6½ hrs.		\$15.70
Operation No. 53	1½ hrs.			Same as Dodge. FREE UP AND EQUALIZE BRAKE SHAFTS AND LEVERS. EACH MATERIAL			
Operation No. 54	1 hr.			None. EQUALIZE AND ADJUST INNER BRAKES ONLY. MATERIAL	10 hrs.		\$18.10
Operation No. 55	1 hr.			None. EQUALIZE AND ADJUST OUTER REAR WHEEL BRAKES ONLY. MATERIAL			
Operation No. 57	½ hr.			None. ADJUST EMERGENCY BRAKE ON TRANSMISSION. MATERIAL	4 hrs.		\$6.00

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL OPERATIONS SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

## PAIGE 6-66 AND JEWETT

Operation	Max. Time	Labor Charges	Total Charge	Parts Prices	Max. Time	Labor Charges	Total Charge
Operation No. 50	10½ hrs. 7¼ hrs.			RELINING AND ADJUST HAND AND FOOT BRAKES OR TRANSMISSION BRAKE. PAIGE JEWETT	3 hrs.		
Operation No. 51	5 hrs. 2¼ hrs.			Same as Dodge. RELINING AND ADJUST OUTER BRAKES ONLY PAIGE or TRANSMISSION BRAKE JEWETT. PAIGE JEWETT	9 hrs.		
Operation No. 52	5½ hrs. 5 hrs.			MATERIAL. RELINING AND ADJUST INNER BRAKES ONLY PAIGE or OUTER SERVICE BRAKE JEWETT. PAIGE JEWETT	6 hrs.		
Operation No. 54	3 hrs. ½ hr.			MATERIAL. Same as Dodge. EQUALIZE AND ADJUST REAR WHEEL INNER BRAKES PAIGE or TRANSMISSION BRAKE JEWETT. PAIGE JEWETT	6 hrs.		
Operation No. 55	1 hr. 1 hr.			MATERIAL. None. EQUALIZE AND ADJUST REAR WHEEL INNER BRAKES PAIGE or REAR WHEEL OUTER BRAKES JEWETT. PAIGE JEWETT	½ hr.		
Operation No. 53	3 hrs. 1½ hrs.			MATERIAL. None. FREE UP AND ADJUST ALL BRAKE RODS AND SHAFTS ONLY. PAIGE JEWETT	1½ hrs.		

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL OPERATIONS SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

## PACKARD—Models 116-126-133

Operation	Max. Time	Labor Charges	Total Charge	Parts Prices	Max. Time	Labor Charges	Total Charge
Operation No. 50				RELINING AND ADJUST INNER AND OUTER BRAKES (Right and Left). MATERIAL	12 hrs.		\$27.00
				7½ ft. 120828 brake lining. 80 in. 120827 brake lining. 2 116190 Key (Timk. Axle). 2 120488 Key (Pack. Axle). 1 114300 spring. 70 rivets.			
Operation No. 51				ADD \$1.50 to standard price for disc wheels. RELINING AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL	6½ hrs.		\$15.70
				7½ ft. lining. 2 keys. 1 spring. 38 rivets.			
Operation No. 52				ADD \$1.50 to standard price for disc wheels. RELINING AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL	10 hrs.		\$18.10
				80 in. brake lining. 32 rivets.			
Operation No. 53				ADD \$1.50 to standard price for disc wheels. FREE UP AND EQUALIZE ALL BRAKE SHAFTS AND LEVERS. MATERIAL	4 hrs.		\$6.00
				None. ADD \$1.50 to standard price for disc wheels. EQUALIZE AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL	1 hr.		\$1.50
Operation No. 55				None. EQUALIZE AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL	2 hrs.		

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL OPERATIONS SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

## STUDEBAKER—Big-Special-Light Six

Operation	Max. Time	Labor Charges	Total Charge	Parts Prices	Max. Time	Labor Charges	Total Charge
Operation No. 50				RELINING AND ADJUST INNER AND OUTER BRAKES (Right and Left). MATERIAL	9 hrs.		
Operation No. 51				Same as Dodge. RELINING AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL	6 hrs.		
Operation No. 52				Same as Dodge. RELINING AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL	6 hrs.		
Operation No. 53				Same as Dodge. FREE UP AND EQUALIZE ALL BRAKE SHAFTS AND LEVERS. MATERIAL	6 hrs.		
Operation No. 54				None. EQUALIZE AND ADJUST OUTER REAR WHEEL BRAKES ONLY (Right and Left). MATERIAL	½ hr.		
Operation No. 56				None. EQUALIZE AND ADJUST OUTER AND INNER BRAKES ONLY (Right and Left). MATERIAL	1½ hrs.		

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL OPERATIONS SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.



## BUICK—Models H to 22, Inclusive

Operation	Max. Time	Parts Prices	Labor Charges	Total Charge
Operation No. 50	9 1/2 hrs.	RELINING AND ADJUST INNER AND OUTER BRAKES (Right and Left). MATERIAL.		
Operation No. 51	6 1/2 hrs.	Same as Dodge. RELINING AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 52	6 hrs.	Same as Dodge. RELINING AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 53	3 hrs.	Same as Dodge. FREE UP AND EQUALIZE BRAKE SHAFTS AND LEVERS ONLY.		
Operation No. 54	1 1/2 hr.	EQUALIZE AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 55	1 hr.	EQUALIZE AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 56	1 1/4 hrs.	EQUALIZE AND ADJUST INNER AND OUTER BRAKES (Right and Left). MATERIAL.		

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

## HUPMOBILE—Model R and Later

Operation	Max. Time	Parts Prices	Labor Charges	Total Charge
Operation No. 50	11 hrs.	RELINING AND ADJUST INNER AND OUTER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 51	6 1/2 hrs.	Same as Dodge. RELINING AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 52	6 1/2 hrs.	Same as Dodge. RELINING AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 56	1 1/2 hrs.	Same as Dodge. FREE UP AND ADJUST INNER AND OUTER BRAKES. MATERIAL.		

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

## CHEVROLET—490 and Superior

Operation	Max. Time	Parts Prices	Labor Charges	Total Charge
Operation No. 50	5 1/2 hrs.	RELINING AND ADJUST INNER AND OUTER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 51	3 hrs.	Same as Dodge. RELINING AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 52	3 hrs.	Same as Dodge. RELINING AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 53	3 hrs.	Same as Dodge. FREE UP AND EQUALIZE ALL BRAKE SHAFTS AND LEVERS. MATERIAL.		
Operation No. 54	1 hr.	None. EQUALIZE AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 55	1 hr.	None. EQUALIZE AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL.		

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

## WILLYS-KNIGHT—Model 20 and Later

Operation	Max. Time	Parts Prices	Labor Charges	Total Charge
Operation No. 50	6 hrs.	RELINING AND ADJUST OUTER AND INNER BRAKES (Right and Left). MATERIAL.		
Operation No. 51	5 hrs.	Same as Dodge. RELINING AND ADJUST OUTER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 52	4 hrs.	Same as Dodge. RELINING AND ADJUST INNER BRAKES ONLY (Right and Left). MATERIAL.		
Operation No. 53	6 hrs.	Same as Dodge. FREE UP AND ADJUST ALL BRAKE RODS AND SHAFTS. MATERIAL.		

NOTE—WHEN SELLING BRAKE LINING OPERATIONS BE SURE TO EXAMINE THE BRAKE OPERATING SHAFTS AND LEVERS—RUSTED BRAKE SHAFTS REQUIRE CONSIDERABLE TIME TO FREE UP AND OPERATION No. 53 OR SPECIAL SHOULD BE SOLD IN ADDITION TO THE ACTUAL RELINING OPERATIONS.

(Continued from page 19)

for the installing of new main and rod bearings.

RUNWELL—Install new main and rod bearings:

Max. Time	Labor Charge	Parts	Total Charge
40 hrs.	\$60	\$12	\$72

Now suppose that you have a lot of equipment that can be used to advantage on this job so that instead of charging \$1 per hour you charge 50 cents additional per hour in order to cover cost and depreciation on this equipment. With such facilities you perhaps can do the job in 35 hours FOR WHICH YOU WILL RECEIVE ON THE TIME BASIS .....\$64

There will be no incentive to complete the work quickly because if you work unusually hard and finish in 30 hrs. you will receive pay for 30 hrs. or.....\$57

BUT if you work under Flat Rate and complete the job in 35 hours you receive pay for (40) FORTY HOURS or.....\$72

Which means \$7.50 of velvet, part of which you can split between the men who have done such good work.

If the men learn that they are to receive a bonus for extra special effort they might do the job in 30 hrs. but you still receive .....\$72

WHICH MEANS THAT YOUR HOURLY RATE OF \$1.50 has increased to \$2.40 which gives you a safe working margin for a reasonable profit and something to offset slack periods, lost time, etc. Why work under a system where your better knowledge of a car, your clever little special tools, and your trouble shooting ability PAYS YOU ONLY AS MUCH AS THE FELLOW WHO HAS NOT THE TECHNICAL KNOWLEDGE, THE SKILL, OR THE SPECIAL FACILITIES THAT YOU HAVE?

To all of which the brand of maintenance merchant described in the first paragraphs will say: "Very well, but what if the work can't be completed within the Flat Rate time limit?" The answer is, that you must have a sensible Operation Schedule that will cover as far as possible the "unforeseen" and then sell the operations intelligently.

One of the most difficult of FLAT RATE OPERATIONS CONCERN THE BRAKES OF THE CAR AND WITH THIS IN MIND WE WISH TO CALL YOUR ATTENTION TO THE NECESSITY OF A SEPARATE OPERATION TO COVER INSPECTIONS, AND FREEING UP OF RUSTED, BENT OR FROZEN PARTS, not only on the brakes but on every unit of the car susceptible to these conditions. There will of course, always be cases here and there where a certain job will be a loss. In every case where you haven't an operation to cover a job that you know nothing about don't attempt Flat rate on that job but sell it on the time basis.

Regarding Operation Schedules MOTOR AGE presents Flat Rate data secured from organizations actually OPERATING on Flat Rate. The labor "Maximum Time" is based on a time study of each

job EXECUTED NOT LESS THAN 20 TIMES AND UNDER AVERAGE CONDITIONS WITH AVERAGE FACILITIES. To the great number of truly honest maintenance men who harbor the belief that Flat Rate is unfair to the car owner we would advise meditation over the fact that Ford maintenance costs the owner LESS than an equal amount of maintenance on any other car, yet the Ford Flat Rate system of selling maintenance LABOR is recognized as the best paying proposition in the maintenance business.

Close on the heels of Ford are Dodge, Chevrolet, Hupmobile, Buick, Marmon, Packard, Cadillac, and some others, all leaders in maintenance on the Flat Rate basis. Are there any better looking or better paying establishments in your town than the shops operated by dealers representing the cars mentioned?  
**Comparatively Bigger Market for Maintenance**

Over 60 per cent of the cars registered in the United States are owned in towns of less than 10,000 population. This means that though the bulk of the cars belong to farmers, workmen, merchants and industrial organizations in these towns are included in the 60 per cent. Invariably in towns of less than 35,000 there is only one dealer for each make of car sold. This means that as far as maintenance is concerned on Runwell cars he is all to the good. If he can deliver satisfactory maintenance he can be assured of all the repair jobs on all the cars of his make in the territory.

It is true that in total numbers his market is less than the city dealer but based on number of cars per capita for the two towns the small dealer is working in a territory where a greater percentage of the population own cars. It is a pretty well founded fact that car owners, especially farmers, retain their original cars for a longer period than do the city owners. All things being equal, the older a car and the longer its period of service, the greater will be the amount of maintenance necessary to keep it in efficient running shape.

The complete overhaul of a motor vehicle, and the major repair operations probably are executed more often, comparatively, in the small town than in the city.

From opinions gained from personal interviews it appears that the car dealer in the small towns has come to the realization that the market for maintenance at the present time is more favorable than the car sales market, and the near future undoubtedly will show greatly increased activity of these dealers along lines of efficient maintenance merchandising.

#### More Personal Contact

Very few small town dealers derive the full benefit possible from the closer contact between dealer, mechanic, and car owner. There are exceptions to this, but they are found usually among dealers representing the two cars which have the largest production, and always in the establishment that is operating on Flat Rate.

If improperly applied the personal contact incident to the small town service station is a detriment rather than a help, and the average dealer is inclined to consider it as such. The trouble is, that customers are allowed to frequent and loaf in the shop while their car is being repaired. Aside from the fact that owners tend to lessen the shop morale and place a financial burden on themselves and customers absent, their presence in the workshop places a difficulty in the path of the Flat Rate.

It is not the practice to allow the indiscriminate admittance of owners, in other lines of maintenance endeavor, and if the merchant in our branch of maintenance wants efficiency he will enforce the "No Admittance" sign. Regarding this phase of the business it is interesting to hear what F. A. Oberheu of United Motors Service has to say regarding it.

"Contrasted with the automobile service business, we know of only one reason why so few people know how long it takes to dry clean a suit of clothes. It is because the dry cleaner will always talk about the price to 'clean and press' rather than to set up an hourly rate, thereby inviting everyone to come over, 'stand around in his underwear' and watch the job. The florist does not tell you the number of hours required to grow a rose, and the watchmaker seems to say very little as to his hourly rate or how long it will take to 'clean 'er up.'"

Perhaps the biggest advantage accruing from the closer contact between owner and dealer is that he the dealer can explain in simple language his reasons for adopting the Flat Rate System. Any intelligent car owner who has had repeated dealings with his dealer is inclined to listen to the story of a man who can show him frankly that to equal the standards of business in other lines, something better than the hourly system is necessary.

The story referred to was printed in an earlier installment of this series in MOTOR AGE. At least one recognized Service Sales Manager has agreed that there is something wrong with the hourly system and for the benefit of those readers who did not have the time to read the July 12th issue "How Flat Rate Makes for the Dealer's Profit" we are here printing the substance of that installment in slightly different words, a straight story that can be told to the skeptical customer who "can't see" Flat Rate.

This story assumes that the Shop proprietor is selling his repairs on an hourly basis at \$1.25. We have also assumed that the shop employs two men at 50 cents per hour. This is the story:

"Flat Rate is the best method found to date for both you and I. When you bring your car in here it is only natural that you should want to know how much will be my charge for the LABOR because you are in the habit of hearing from other merchants in the town the price of their goods before you buy. The blacksmith, horseshoer, and your wife's dressmaker generally give you their fixed

price for any job you give them. The Flat Rate system in this business of repairing your automobile allows me to do the same as the horseshoer and the dressmaker. It isn't costing you any more than the old time system, mostly less, and it's more of a business-like proposition than the old system. It is better for me too, because it tells me just where I stand and gives me a chance to give still better service and take care of the men in the shop as they deserve.

"I have two mechanics here in the shop and they are good ones. I charge you \$1.25 for every hour that these men put in on your car and when I pay them 50 cents an hour I have gone my limit because my expenses under this time system take most of the remaining 75 cents and I don't have enough left to give these men a raise when they deserve it. You know as well as I that labor in other lines is demanding a higher salary than these men receive so it takes a lot of diplomacy and concessions on my part to keep a good man, and good men now, are hard to find.

"This is the way the thing stacks up: If each of my men work the full week of 48 hours they will have in their pay envelope just \$24 on Saturday night. Now with just a little allowance for time off, sickness, holidays and the little idle time that always is, these men lose a part of their pay, and my expenses go on just the same.

"Now the amount of labor that I sell is the amount that I ring up on the cash register and if I wish to continue honest with you, I will find that only about forty hours out of the possible forty-eight can be accounted for on the jobs for which I get paid. This means that to make up for those 8 lost hours every week I am paying that man 60 cents an hour although I hired him for fifty.

"If I sell 40 hours out of the 48 at \$1.25 my income is \$50. The two men at this rate make my income for the week \$100, out of which I must pay them 48 dollars, leaving me just \$52 to pay for rent, upkeep, heat, light, etc. This doesn't leave much for a salary for myself as you can see.

"Under this Flat Rate plan if my men find a new and quicker way to do these repair jobs it gives them and myself a little reward for the extra effort. When I get a certain fixed price for a job the men are inclined to find a new and perhaps faster way to complete the work and it gives me a chance to buy equipment that will speed up, and make the service better and cheaper for you because it makes it possible for me to get still more per hour, at the same time lowering the cost of the job for you.

"If I continue to work on the straight hourly system the only way for me to make both ends meet is to tell the men to take their time on the work because the more hours I put in on your job the more I will get out of you until you begin to wonder why that last valve grind took us so long to finish.

"It won't be many years from now when the car manufacturers will set a limit on the price of repair work and as I in-

(Continued on page 25)



# Summary Specifications of the 1923 Indianapolis Race Cars

ALTHOUGH minor changes may have been made in the construction features of these cars since Decoration Day the chassis today are fundamentally the same. Carbureter equipment, ignition systems and spark

plugs are varying quantities on a racing car but they are the only differences between the cars listed as they were then and as they are now. It is usually impossible to secure the gear ratio information because of the fact that individual

cars of the same team may have different ratios and also because each of the different tracks in the country demand a different rear axle ratio. In every case the cars are listed as they were equipped just before the Indianapolis race.

MAKE AND MODEL	WHEEL BASE	PISTON DISPLACEMENT CUB. IN.	POINT SUSPENSION	FUEL SYSTEM		IGNITION SYSTEM				CLUTCH		GEARSET		UNIVERSAL JOINTS TYPE & MAKE	REAR AXLE					TIRES		WHEEL TYPE AND MAKE	TYPE AND LENGTH REAR SPRING	TYPE AND LENGTH FRONT SPRING			
				CARBURETOR MAKE AND NO.	FUEL FEED	TYPE	MAKE	CONTROL	CURRENT SOURCE	VOLTAGE	MAKE	TYPE	MAKE AND LOCATION		PROVISION FOR DISENGAGING COUNTERSHAFT	NUMBER FORWARD SPEEDS	REAR AXLE MAKE	FINAL DRIVE	REAR AXLE TYPE	DIRECT GEAR RATIO	TORQUE TAKEN BY				PROPULSION TAKEN BY	FRONT	REAR
PACKARD	100		4	MILLER DOUPLEX	PRESSURE	MAG. 2 OR 3 BATT.	SCINTILLA OR DELCO	MANUAL	8 VOLT BATTERY	8	PACKARD	PLATE	PACKARD UNIT	YES	4	METAL	PACKARD	STRAIGHT BEVEL	SEMI FLOATING				30X5	30X5	WIRE R.W.	SEMI ELL	SEMI ELL
DUESENBERG			4	OMAC DUPLEX	PRESSURE	BATTERY	DELCO	MANUAL	8 VOLT BATTERY	8	DUESENBERG	PLATE	DUESENBERG UNIT	YES	3	FABRIC CLIMAX	DUESENBERG	STRAIGHT BEVEL	SEMI FLOATING		TORQUE TUBE	T.T. TO CLUTCH CROSS M.	29X4 1/2	30X5	WIRE R.W.	SEMI ELL	SEMI ELL
MERCEDES	107 1/2		4	MERCEDES 1 WITH SUPERCHARGER	PRESSURE	MAG. 2	BOSCH	MANUAL			MERCEDES	CONE	MERCEDES A MID	YES	4	METAL	MERCEDES	STRAIGHT BEVEL	SEMI FLOATING	3 1/2-1	TORQUE TUBE	T.T. TO GEARSET	29X4 1/2	30X5	WIRE R.W.	SEMI ELL	SEMI ELL
DURANT	100			MILLER DOUPLEX	PRESSURE	BAT.	DELCO	MANUAL	8 VOLT BATTERY	8	MILLER	PLATE	MILLER UNIT	YES	3	FABRIC THERMOP	MILLER	STRAIGHT BEVEL	SEMI FLOATING		TORQUE TUBE	T.T. TO GEARSET	29X4 1/2	30X5	WIRE R.W.	SEMI ELL	SEMI ELL
H. C. S.	100			MILLER DOUPLEX	PRESSURE	BAT.	DELCO	MANUAL	8 VOLT BATTERY	8	MILLER	PLATE	MILLER UNIT	YES	3	FABRIC THERMOP	MILLER	STRAIGHT BEVEL	SEMI FLOATING		TORQUE TUBE	T.T. TO GEARSET	29X4 1/2	30X5	WIRE R.W.	SEMI ELL	SEMI ELL
FORD	98			ZENITH 2	PRESSURE	MAG.	SCINTILLA	MANUAL			FORD	PLATE	FORD UNIT	NO	2	METAL	FORD	STRAIGHT BEVEL	SEMI FLOATING	3 1/2 TO 1 1/2-39	TORQUE TUBE	T.T. TO CRANKSHAFT	29X4 1/2	29X4 1/2	WIRE R.W.	FORD CROSS	FORD CROSS
BUGATTI	94			ZENITH 1 AND 2	PRESSURE	MAG.	BOSCH	MANUAL			BUGATTI	PLATE	BUGATTI A MID	YES	4	FABRIC	BUGATTI	STRAIGHT BEVEL	SEMI FLOATING		TORQUE ARM.	SPRINGS & T.A.	29X4 1/2	29X4 1/2	WIRE R.W.	1/4 ELL	SEMI ELL

R.W. = RUDGE WHITMORTH  
D. = DAYTON

MAKE AND MODEL	COOLING SYSTEM	OILING SYSTEM	PRESSURE REGULATION BY INTAKE VACUUM	OIL PUMP TYPE	CONNECTING ROD MATERIAL	CONNECTING ROD C.T.O C. LENGTH	WEIGHT OF ONE PISTON- ROD 1/2 RING ASSEMBLY	CRANKSHAFT MATERIAL	NO. OF CRANKSHAFT BEARINGS	TYPE AND NO.					COMPRESSION RATIO	CRANKPIN DIAMETER	MAIN BEARING DIAMETER	CAMSHAFT BEARINGS		CAMSHAFT LOCATION	CAMSHAFT DRIVE	SPEED OF MAX. H. P.	OIL USED AT INDIANAPOLIS	"SPARK PLUGS	SHOCK ABSORBERS	FRAME MATERIAL
										1	2	3	4	5				NO.	TYPE							
PACKARD	PUMP	HOLLOW SHAFT PRESSURE	NO	GEAR					3	BALL	PLAIN	BALL			7+701			4	HOLLIS PLAIN PUSH BALL	O HEAD 2	GEAR TRAIN			K.L.G. REBERBER	HTFD	STEEL
DUESENBERG	PUMP	PRESSURE	NO	GEAR	C.V.		18 1/2 OZ.		3	BALL	PLAIN	BALL			6+701			6	1 1/2 INCH BALL THAMES PLAD	O HEAD 2	GEAR TRAIN	WILSON	A.C.	HTFD	DURALUMIN	
MERCEDES	PUMP	PRESSURE	NO	GEAR					3	ROLLER	ROLLER	ROLLER			6+701				O HEAD 2	V. SHAF	4500	OWN	BOSCH	OWN	STEEL	
DURANT	PUMP	PRESSURE	NO	GEAR	C.V.		19 1/8 OZ.		5	PLAIN	PLAIN	PLAIN	PLAIN	BALL	7+701	1 3/4"		9		O HEAD 2	GEAR TRAIN			OIL ZUM A.C.	HT FD	STEEL
H. C. S.	PUMP	PRESSURE	NO	GEAR	C.V.		19 1/8 OZ.		5	PLAIN	PLAIN	PLAIN	PLAIN	BALL	7+701	1 1/2"		9		O HEAD 2	GEAR TRAIN			OIL ZUM A.C.	HT FD	STEEL
FORD	PUMP	PRESSURE	NO	GEAR	V.	FORD	18 OZ. ROD ONLY	C. N.	3	PLAIN	PLAIN	PLAIN			8 TO 1			3	ALL PLAIN	C. CASE 1	GEAR	3600	OIL ZUM A.C.	HT FD	STEEL	
BUGATTI	PUMP	PRESSURE	NO	GEAR	C.V.				3	BALL	BALL	BALL			750+100				O HEAD 1	GEAR	4300	WILSON CAMTROL	BOSCH	HT FD	STEEL	

HTFD = HARTFORD

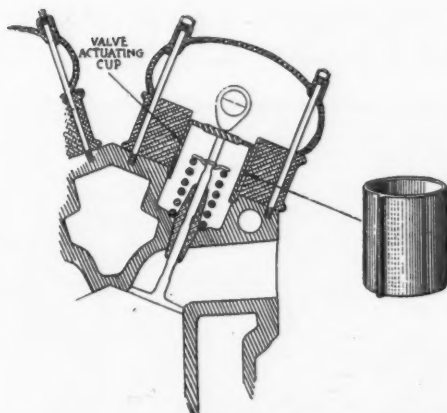
MAKE AND MODEL	STEERING GEAR MAKE	LOCATION	BRAKES		BEARINGS				NO. OF CYLINDERS BORE AND STROKE	ENGINE TYPE	CYLINDER MATERIAL	CYLINDERS CAST	CYLINDER HEADS	PISTON MATERIAL	FITTED WITH TACHOMETER	NO. OF PISTON RINGS	PISTON PIN DIAMETER	PISTON LENGTH	NO. OF VALVES PER CYLINDER	VALVE CLEAR DIAMETER	VALVE LIFT	VALVE HEAD MATERIAL	CRANKCASE INTEGRAL WITH CYLINDERS	CRANKCASE MATERIAL	VALVE OPENING MECHANISM	
			SERVICE	EMERGENCY	LOCATION	GEAR SET	REAR WHEELS	FRONT WHEELS																		REAR AXLE
PACKARD	OWN	R.WHEEL				BALL	BALL	BALL	BALL	2 1/2 5/8 5.4007	VERTICAL	ENBLOC	DETACH	AL.	YES			2						AL.	DIRECT ACTION MECHANISM	
DUESENBERG	ROSS	R. WHEEL	LEX P. NYD.	E. CONT	TRANS	BALL	BALL	BALL	BALL	2 1/2 5/8 5.4007	VERTICAL	AL. BLOC STEEL SLIDES	DETACH	AL.	YES	2 1/2 5/8 1 1/8		4	1"	5/8"	TUNGSTEN	YES	AL.	DIRECT ACTION MECHANISM		
MERCEDES	OWN	F.WHEEL	EXPANDING	FRONT REAR LEVER	FRONT REAR LEVER	BALL	BALL	BALL	BALL	2 1/2 5/8 5.4007	VERTICAL	STEEL SHEET METAL	SINGLE ENBLOC JACKETS	SOLID	AL.	YES	2 1/2 5/8 1 1/8	20 M.M.	4		8 M.M.	NO	AL.	DIRECT ACTION MECHANISM		
DURANT	MILLER	F.WHEEL	EXPANDING	CONTRACT	GEARSET	BALL	BALL	BALL	BALL	2 1/2 5/8 5.4007	VERTICAL	S. STEEL	FOURS	DETACHABLE	AL.	YES	2 1/2 5/8 1 1/8	3 1/2"	2	1 1/8"		NO	AL.	DIRECT ACTION MECHANISM		
H. C. S.	MILLER	F.WHEEL	EXPANDING	"	GEARSET	BALL	BALL	BALL	BALL	2 1/2 5/8 5.4007	VERTICAL	S. STEEL	FOURS	DETACHABLE	AL.	YES	2 1/2 5/8 1 1/8	3 1/2"	2	1 1/8"		NO	AL.	DIRECT ACTION MECHANISM		
FORD	OHMER	GEARSET	E. CONTACT	EXPANDING	R. WHEEL	BALL 2 PLAIN	BALL	BALL	ROLLER	2 1/2 5/8 5.4007	VERTICAL	C. IRON	ENBLOC	DETACHABLE	AL.	YES	2 1/2 5/8 1 1/8	740"	3 1/2"	2	1 1/8"	3/8"	CST IRON	YES	CST IRON	
BUGATTI	OWN					BALL	BALL	BALL	BALL	2 1/2 5/8 5.4007	VERTICAL	C. IRON	FOURS	DETACHABLE	AL.	YES			3				NO	AL.	PISTON PIN	

S. STEEL - SEMI STEEL



It will be observed by reading the specification table that all the cars except two use direct acting VALVE ACTION. There is of course some difference in the size of the parts and their exact arrangement, nevertheless the engines mentioned carry a valve actuating mechanism similar to the Miller as shown in the figure. Duesenberg and Packard use the cup lifter as illustrated but Mercedes makes use of a hardened disk on the end of the valve stem, the construction being similar to the valve mechanism on the Hispano Sulza engine.

None of the American made engines are fully equipped with anti friction bearings on the rod big ends or crankshaft. There are several problems in connection with roller bearings on the rods and crankshaft and to date American designers have stuck by the one piece shaft and plain bearings. Whether



A memory sketch of the Miller direct acting valve opening mechanism

the reduction of friction does not offset the constructional difficulties or the ex-

pense involved in building such an engine does not justify the results we can not state definitely, the fact remains however, that Fiat and Mercedes are using rollers successfully.

Mercedes was handicapped at Indianapolis on account of a car that was too long and too heavy for the track but the roller bearings gave no trouble. Fiat which has three cars entered for the Monza race which are equipped with rollers will provide the only thing resembling competition for Murphy and his Miller Special. It is rumored in racing circles that the showing of the Fiat at Monza, Italy, and the single Mercedes at Altoona on Labor Day will determine whether or not American race car designers will give to the full anti-friction equipped engine the serious study which we believe it is entitled.

## 23 Years Ago This Week In MOTOR AGE

(From MOTOR AGE of Sept. 13, 1900.)

### Winton Issues a Challenge

CHICAGO, Sept. 6.—Alexander Winton of Cleveland today forwarded to W. K. Vanderbilt and Capt. Albert Bostwick at Newport a challenge for an automobile race at 100 miles, to be decided on a smooth track. As a further incentive, a cup valued at \$800 will be given to the winner, provided the race is made a feature of the automobile exposition which is to be held at Washington Park, Sept. 18 to 22. Mr. Winton is an enthusiastic automobilist and participated in the recent Paris-Lyons race.

### When Stearns Began

Among the several promising manufacturers of motor vehicles in Cleveland, the metropolis of Ohio, is the firm of F. B. Stearns & Co. Backed by ample capital and with a well-equipped shop they have been experimenting with gasoline vehicles for several years past, and, although they have built a number of practical carriages, it is only within the past few weeks that they have been offering machines for sale, having disposed of several in this city and other places

recently. At present they are making deliveries within a reasonable time, and, when established in a new factory, for which arrangements are being made, they will be prepared to turn out goods in large quantity.

### A MOTOR AGE Show

The MOTOR AGE begs to announce an automobile exhibition, under its auspices, in the Chicago Coliseum for the last week in March, 1901. It had been planned to hold this exhibition during the present fall, but on consultation with a number of manufacturers, it was ascertained that an exhibition held at the beginning of the buying season would prove more satisfactory to the majority.

### The New York Shows

NEW YORK, Sept. 10.—Preparations for the two automobile shows go right along and while each manager works independently of the other, the exhibitors seem disposed to consider both together. The Madison Square Garden show, which will run from Nov. 3 to 10, will be followed by the one at the Grand Central Crystal Palace, Nov. 14 to 24.

### Locomobile Gets Medal at Paris

NEW YORK, Sept. 10.—Word has just been received at the offices of the Locomobile Co. of America that its vehicles at the exposition on Aug. 18 were awarded a bronze medal for superior workmanship and a gold medal for mechanical improvements.

(Continued from page 23)

tend to be in business for many years to come I have decided to go at the thing in a business like way. When you come in here next week to have that Runwell engine overhauled let me give you my Flat Rate price on the job, we have a lot of new equipment and, if the job isn't satisfactory and doesn't cost you less for repairs during the years running, then I will say that there is nothing wrong with the old hourly system."

In words similar to these the small town dealer can go a long step towards selling the Flat Rate to the car owner who, if we are to believe the story of the

average country dealer, is the greatest stumbling block in the adoption of the system. We are inclined to believe that the trouble is with the dealer himself. Not knowing the full story of Flat Rate he is inclined to doubt its flexibility as a system to be applied to his own shop. If you have any PRACTICAL problems to solve or objections to meet regarding the Flat Rate system bring them to MOTOR AGE and we shall make every effort to offer practical assistance.

THE NEXT INSTALLMENT WILL COVER THE FORMS NECESSARY FOR THE INSTALLATION OF FLAT RATE.

## DAV'S DIARY

SEPT. 13—Gee I wist I new as much about electric juice as Art, him being there with both feet on that stuff. I can generally find where the trubble is if they is trubble in the battery or distributor or the spark plugs but wen it gets inside of the motor or the generator I got to resine me not being able to follow any more a tall. All them wires

that goes twisting around inside the generator and on the armator aint got no sents as far as I can see but Art knows what every one of them things means. He can take one of them wiring diagrams and after a good look at it tell whats busted.

The only trubble with a fellow when he knows so much

is that he is always lookin for something hard to do thats how I got a good one on Art the other day. he was working his head off on a buss which the starter wouldnt work on it. It would work a little but not very much and he couldnt figure it out he had the motor off and looked it all over putting in new brushes which were all right anyway and cleaning the commitator so it was all shiny and wen he put it back it wouldnt run any moren it did before. The bat. had a full charge so he forgot that but as I was going past I seen a big chunk of white stuff on the terminal so wen Art was under the car trying to see if he could see anything thare I unhook this terminal and scrapes it of putting it back before he knew I done nothing.

So I sais Art they aint nothing the matter with this buss except I dont think you hold your foot right on the starter me getting in and trying it myself. Say you shuld of seen Art look wen that thing started off.



# MOTOR AGE'S PICTURE PAGES



*A modern caravan of 500 tourists from Michigan recently camped in Potomac Park. The party has a mayor, post office, barber shop and in fact all the organization of a permanent community*

*At the left is Mrs. J. H. Brown, wife of the Mayor, seated by the official car which is literally a palace on wheels*



*A. B. C. Hardy, President of the Olds Motor Works*



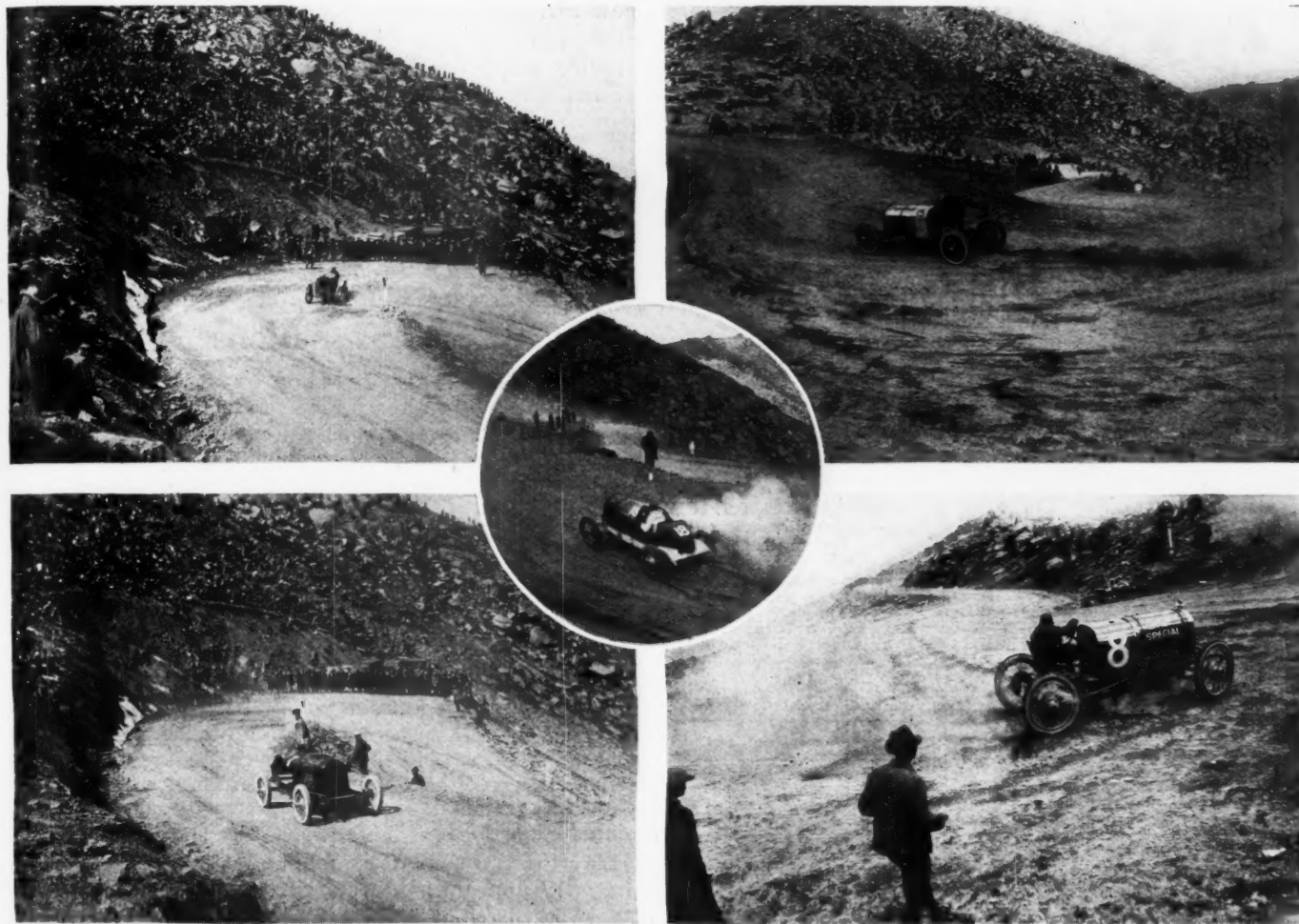
*Railroads are said to be secretly fighting the good roads movement and the truck because the hauling of freight over hard roads cuts into their business. Here is a truck which, by allowing itself to be decorated, won first prize for the Southern Pacific Dining Car service at this year's Rose Carnival at Portland, Ore. A clear case of returning good for evil*



*A 50-H.P. Caterpillar-Dragger of the "Deutsche Kraftflug-Ges" (German Power Plough Society) showing its use for farming and industry*



# OF AUTOMOTIVE INTEREST



## Pike's Peak Hill Climb Races, Colorado Springs, Colo., September 3, 1923

Essex Special—Glen Schulz, winner of Penrose Trophy and first in Event No. 1. Time, 18 min. 47 <sup>3</sup>/<sub>5</sub> sec.

Paige Special—J. C. Allen, second in Event No. 3.

Lexington Special—Otto Loesche, winner 1920 Penrose Trophy. Time, 19 min. 29 <sup>4</sup>/<sub>5</sub> sec.

Studebaker—Charles Myers, second best time this year. Time, 19 min. 21 <sup>2</sup>/<sub>5</sub> sec.

Time, 20 min. 22 <sup>3</sup>/<sub>5</sub> sec.

Lexington Special—Jack Knight, second in Event No. 2. Time, 21 min. 48 <sup>2</sup>/<sub>5</sub> sec.



From the 14,109-ft. summit of the peak, sixty thousand square miles of earth can be seen

# MOTOR AGE

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## The Transportation Store

A MAN who knows most of the service managers in New York and its environs says that, with one or two exceptions, these men are dissatisfied with their present surroundings, wages, rated importance in the company and other things that go to make a man happy in his job.

Another man who knows well the salesrooms in New York City says that the automotive merchants in that community have overdeveloped the salesroom and selling end of the business.

To those who look at the automotive dealer industry as a real business venture this would seem to spell a bad future for at least some of the New York merchants and it is quite a bad example to set for the rest of the country.

If it is true that most of the service managers in New York are dissatisfied, then those men are not doing as good work as they should and the cars that have been sold in that community are bound to suffer. Instead of the gorgeous New York salesroom being a magnificent advertisement for the car, it is going to be a handsome sepulchre, because no car, can gain a good name and be well advertised where it is not well serviced.

It has been a merchandising maxim for years that a New York store was an advertisement to the world.

Automotive merchandising is different from other lines, in that the sale is only the beginning. The man who will survive is the one who sells transportation and only a small part of that transportation is in the brand new car.

If what we hear about salaries paid to New York service managers is true, we know of many smarter automotive merchants in smaller cities than those in New York.



*"Sell the public confidence in the automobile dealer."*



## Associations

A GROUP of electrical shop owners in a Wisconsin city have rather a new development in associations. They have occasional meetings and informally they have raised their businesses from a personal quarrel and a speculation to a regular business basis. This has been done without formal organization. But the men in the electrical business in that city say that very effective work has been accomplished.

This sort of thing is rather a novelty and yet it represents what, after all is said, is the greatest objective in association work. Most of the men in this group were not friendly with each other a year ago. They are friendly now and they have learned that each of them has problems that are similar to the other man's problem. They have talked over business prospects and have agreed upon certain common dangers. Without an agreement, many of these things have been remedied.

But this movement is made the subject of a story that will appear in MOTOR AGE in the very near future. The idea we had in mentioning it here is merely to suggest that friendliness and understanding are the great objectives in business association work. After the members have felt the benefit of friendliness and understanding for themselves, they usually want to extend this feeling to others and hence comes the formal organization. When that is effected, then comes the necessity for a manager and this, we believe, rather clearly defines the duties of the manager or secretary of an association.

If a secretary or manager of a business association does not see that he is to be aggressive in his efforts to aid his members and others in the same line of business, then he is not a competent manager or secretary. There is no need of employing a secretary if he is merely to keep minutes. He must be a trade missionary.



*Inspection service must be sold, owners will not ask for it.*



## Four-Wheel Brakes

THE automotive world is full of rumors about four-wheel brakes. Some of the wildest stories that have gone the rounds in years concern the performance of this mechanical feature on the recent models of cars. We have made an effort to trace some of



these dire rumors to their source, but they are as elusive as the will-o'-the-wisp.

The answer to the four-wheel brake is written beyond recall in many of these rumors, but it is a matter of record that snap judgment has sometimes been mistaken. The dealers most concerned in four-wheel brake cars seem to be the most cheerful of all dealers about this innovation. It is really interesting to see how unappreciative these dealers are of the sympathy offered to them by some of their fellow dealers.

The opinion has been ventured in some quarters that the maintenance men of the country cannot handle these brakes. Right here we want to go on record as having faith in the maintenance men of the country to properly service any device that the engineers produce that is fundamentally right. The maintenance man is loyal and faithful to his job and he will sit up nights to study these brakes when they come to him and master the details as they concern him.

As to four-wheel brakes, we would suggest more facts and less rumor.



*"What this industry needs is not more dealers but better ones."*



### Guarantee Grievances

TEN months ago Ed Williams drove a new Blank Car from the Blank Auto Agency down at Dead Center, Ill. Now this was not the first car Ed had owned. He knew it needed oil and water as well as gas, and he also knew how to break it in without breaking it up. The result was that the car continued to ramble as a good car should, and Ed found no occasion to go back to the Blank Agency for work during the guarantee period.

However, one drizzly day, when Ed was in a special hurry, the combination of a mean curve and a stubborn curbstone proved too much for the little car, and Ed was left stranded with a broken wheel and a bent axle. A telephone call however, brought the wrecking truck from the Blank Agency and back at the shop, while waiting for the job to be finished, Ed got into conversation with the proprietor who had sold him the car.

When the car was ready Ed looked at the bill and at the proprietor. The bill read:

Towing .....	\$ 2.00
Labor, two hours.....	2.00
Wheel .....	6.00
Axle shaft.....	2.00
Total .....	\$12.00

To the unprejudiced observer the bill was perfectly fair, but Ed, being a crafty customer immediately started to bluster.

"That's a fine way to treat a good customer, here I buy a car from you, give it such good care, that it doesn't cost you a cent for guarantee work, then when I have some hard luck on the road you hand me a bill like this. Seems to me I have something coming. Then too you know, I've been boosting your place to all my friends, and you ought to treat me right."

The customer was the better salesman, the proprietor was silenced as far as a comeback was concerned. Instead of telling Ed that the cars were so well made that practically no guarantee work was needed, he fell

for the kick and said, "Let's take the bill, I'll have it fixed up." When it came back it read:

Wheel .....	\$6.00
Axle shaft.....	2.00
	\$8.00
Less 25%.....	2.00
Total .....	\$6.00

The proprietor was later heard to remark that his shop never made any money, but who would expect a dealer with so little back bone to consistently make money?



*Every day customers are lost because a gob of grease is left on the seat or steering wheel.*



### Sales Displays

A CANVASS of thirty automobile stores on Labor Day found an even division of open and closed stores. Several of the salesmen on duty were there waiting for people who had made appointments. None of the men who were there to merely keep the store open were happy about it. They did not think they were doing much good.

The closed stores supplied the surprise. In five of the stores that were not open to the public, the car most prominently on display apparently had very ill-fitting hoods. In four of the cases these hoods had been left unlocked. In the fifth, it could not be determined whether the hood was unlocked or merely did not fit.

In two stores the car at the front of the display had discolored radiators. The effect was exactly that of a leaky radiator. So almost half of the stores that were closed left exhibits of merchandise that were likely to discourage window shoppers.

Merchants must remember that even if they and their employees do take a well deserved holiday, the show windows are likely to keep on working.



*"Dolling them up" helps to move used cars.*



### How About Territory?

RECENTLY MOTOR AGE printed a statement regarding the tendency of salesmanagers of factories to insist on more intensive representation, even to the point of putting two dealers where only one flourished before. This is a subject that we have heard much discussed by dealers and factory representatives and we know many earnest persons who are looking forward to the answer.

How does the dealer regard this move?

What does the distributor think of it,

Is it good or bad merchandising policy to cut territory?

Is there any basis of discussion for this question, or is it to be accepted that the factory salesmanager who is insisting upon more distributors and more dealers is entirely right?

If any dealer thinks that he has been imposed upon, he should give voice to his feelings. If dealers regard this tendency as dangerous to their future they should go on record. The question is wide open.

# 1923 Output to Be Nearly 4,000,000

## August Production Reached 348,733 Cars and Trucks

**Total for First Eight Months of Year  
Was 2,701,064, Exceeding  
Whole of 1922**

NEW YORK, Sept. 8.—Production of 348,733 cars and trucks gave August an increase of 6.5 per cent over July and demonstrated that the industry has picked up the thread of manufacture following the drop of July from the steady pace which was maintained throughout the late Spring and early Summer period. This is the estimate made by the National Automobile Chamber of Commerce from shipping returns received.

August's production this year beats the 272,589 of August, 1922, by 74,144 and is 21,000 in excess of July this year. This, too, despite the handicap occasioned by the introduction of new models by several of the big units in the General Motors group, by Dodge and Studebaker and the slowing down of Ford because of radical changes in body design. Therefore it is all the more remarkable that August should show such a comeback.

The pickup of August brought about the creation of a new record in that the total production for the first eight months of the year, 2,701,064, exceeds the total of 2,659,064 for the full year of 1922, which represents the peak year in American automobile production. In other words, the industry starts in on September with more than 40,000 "vel-

NEW YORK, Sept. 10.—The following comparative table shows the production of motor vehicles by months this year and last. The figures are compiled by the National Automobile Chamber of Commerce.

	1923	1922
January .....	243,104	91,109
February .....	276,467	122,366
March .....	354,319	172,720
April .....	382,001	219,558
May .....	319,163	256,219
June .....	376,882	289,011
July .....	327,102	246,607
August .....	340,000	272,589

vet" in its record breaking dash, and it is only a question of how much the high water mark of 1922 will be beaten.

The figures indicate that the grand total for the year is going to be close to 4,000,000. The average monthly production for the first eight months of 1923 was 337,721. If that is maintained for the remaining four months the count would be in the neighborhood of 4,051,652. Even if the industry turns out only the same number as it did in September, October, November and December, 1922 which was 1,149,698, the final figures would be 3,851,469.

Allowing for 10 per cent being trucks, which is a conservative estimate, it would look as if the passenger car production would in itself beat any previous best for both cars and trucks by a wide margin. This would mean at least 3,600,000 passenger cars, whereas last year the passenger car count was 2,406,396.

## Increased Activity Is Seen in Car and Truck Factories

**New Models and Reduction in Prices  
Is Stimulus to Sales; September Outlook**

NEW YORK, Sept. 10.—Passenger car and motor truck manufacturing plants are showing increased activity, September following the setting of a relatively high production mark last month. The 348,733 cars and trucks estimated as August output was greater than the total for the preceding month and only a few thousand short of March, the month when the industry, for the first time this year, exceeded 300,000 in its monthly output totals.

The introduction of new models by some manufacturers and a reduction in prices by others have had a stimulating effect on sales. Orders on hand with many of the major companies, particularly those that have made changes in their products, are reported to be sufficient to warrant capacity operations for 60 days.

Several plants are operating at top speed and others report that they expect to reach capacity levels this month. Ford, which dropped behind its schedule of 180,000 in August, incidental to bringing out its new models, is expected to return to the 7000 daily mark this month and maintain operations steadily at that figure, or in excess of it.

Sales in August were behind those reported in July except in half a dozen states, where improvement was noted. Advices received from chief distributing centers throughout the country indicate a good fall business. Commercial sections of the East report a picking up in business after a slowing down experienced in August. In certain parts of the South the prospects for increased sales of automobiles are excellent, retailers reporting encouragement from the cotton outlook. Georgia was one of the half dozen states in which sales were better last month than in the month previous.

In the middle west more favorable signs are apparent of increased sales. Iowa, for instance, reports higher prices for hogs, which, in turn, has placed the farmer in a better buying mood. Not only in that state but in other parts of the section farmers are purchasing cars, although not in the volume earlier anticipated. Country fairs, with their automotive exhibits, and various demonstrations in farming areas are doing much toward stimulating interest in automobiles, motor trucks and tractors.

## DUNLOP MAKES SOLID TIRES

BUFFALO, N. Y., Sept. 10.—Building of solid tires has been started by the Dunlop Tire & Rubber Co., at its plant in Buffalo.

## LOWER PRICE FOR NEW OAKLAND

PONTIAC, Mich., Sept. 10.—Prices of the new Oakland models, announced last week, are from \$30 to \$120 lower than on similar models of the old line. The new five-passenger touring car is priced at \$945 as compared with \$995 for the 1923 touring car. The new sedan is \$1395 compared with \$1515 for the old sedan. The new price list is as follows:

Model	Price
Standard touring .....	\$ 945
Standard roadster .....	945
Sport touring .....	1095
Sport roadster .....	1095
Business coupe .....	1195
4-pass. coupe .....	1345
Sedan .....	1395

## COLE TRIES BALLOON TIRES

INDIANAPOLIS, Sept. 8.—The Cole Motor Car Co. of this city at its exhibit at the State Fair Automobile Show this week announced a model with balloon tires as standard equipment. It showed a sport model with the new tires which will be standard for all these models the company produces. The car was also unique in that it had a new rear tire-carrier designed to carry a balloon spare. The balloon tires will be optional equipment on all other Cole models.

## R & V PRICES DOWN

EAST MOLINE, Ill., Sept. 10.—Price reductions averaging about \$500 were announced today on all models of R & V Knight cars, by the R & V Motor Co. The new price list compared with the old follows:

	Old Price	New Price
5-pass. touring .....	\$2850	\$2300
7-pass. touring .....	2900	2375
4-pass sport .....	2850	2400
Coupe .....	3500	3000
5-pass. sedan .....	.....	3050
7-pass. sedan .....	3700	3250

## FORD'S WEEKLY PRODUCTION

DETROIT, Sept. 10.—Working only five days, the Ford Motor Co. produced 33,436 cars and trucks and 1706 tractors in the week ended Tuesday, Sept. 4. The output of Lincolns was 176. For the month of August the company manufactured 172,000 cars and trucks compared with 183,535 in July, a decrease brought about by a change in models. The September schedule calls for more than 185,000.

## FORD WANTS SHOALS

WASHINGTON, Sept. 8.—Efforts were renewed this week by the Ford Motor Co. to purchase the Muscle Shoals Power plant of the government, located at Sheffield, Alabama.



## Good Car and Good Dealer Begin to Hook Up, Says Vane

### N. A. D. A. Manager Discusses Eagerness of Distributors to Adopt Better Merchandising Methods

ST. LOUIS, Sept. 12.—Automobile "factory travelers" with merchandising ability who are able to communicate their knowledge to dealers are coming into demand in the automobile field, says C. A. Vane, general manager of the National Automobile Dealers Association. The passing of the "brainless wonder" and the appearance of men who can assist and instruct automobile dealers in profitable and practical methods of merchandising is under way.

Forceful feeding has been one of the practices in the industry against which the dealers have rebelled and the National Automobile Dealers Association has protested. Much of this forceful feeding has been charged to the old time territory man who worked high pressure methods and in many instances simply "unloaded" automobiles on almost defenseless dealers.

The "territory man" became opprobrious in many instances and there was invented the derisive and satirical name of the "brainless wonder." It was the business of these men to influence the dealers to take automobiles. And it is largely conceded that through the efforts of these men in the last six years the industry has been enabled to reach the enormous expansion that in 1923 produces and ships 3,000,000 automobiles. Whether they profited by the volume was a point the old time territory man cared little about. "Move the stuff" was his motto.

#### Vane Talks to Many

Vane has talked with hundreds of distributors, thousands of dealers and scores of automobile factory representatives and officials this year. The National Automobile Dealers Association has been urging better merchandising and suggesting certain ways and means which could be used to accomplish the same results for the industry with more profit and better endings for the dealers.

In his travels this year Vane has found a widespread demand for assistance in applying good merchandising methods and improved practices in the shops. He has found also serious hostility on the part of the dealers to the old time type of territory man. The dealers are not so worried this year about taking quantities of cars as they are to know how to sell the increased quantities.

It is also quite plain that through the fall and winter the dealers are going to steadily become more insistent for merchandising information and assistance and steadily more hostile to being loaded up with automobiles if they have to store these cars through the winter at a cost (interest charges, rent and insurance) that exceeds the profit they will realize when the cars are finally sold by them.

Many elements are involved in the new temper of the dealer, says Vane. He

points out that the N. A. D. A. has been steadily carrying on its work and that in the last two years it has centered attention of the public and the industry on the merchandising practices and integrity of the dealers. Vane is convinced that the mass conscience and pride of the automobile dealers has been aroused. This work of the N. A. D. A. has also become intensely interesting to the bankers. Many instances of this condition have come to the attention of the N. A. D. A. One of these recently was a case in which a dealer for a low priced car reported that the tactics of the factory was making it impossible for the dealer to make money. The dealer's banker refused to continue to finance him threatening to call all loans unless the dealer changed to another line of cars.

The spirit of the change in the industry has been general in the last two years. It is not at all difficult today says Vane, for a dealer who is properly capitalized and who has been properly conducting his business to obtain another franchise. In practically every city there are openings.

"The good car and the good dealer are beginning to hook up," Vane remarks in summing up the trend toward higher calibre men in the factory field work "and the banker is taking considerable interest in the tactics of the factories as they will affect the possibilities of the dealers making money and building a permanently profitable business. The N. A. D. A. has whetted the dealers' appetite for information and knowledge. The N. A. D. A. also has sold the public on the necessity for confining business to those dealers who have good merchandising practices. The combination of all of these things, makes it imperative that the territory man of yesterday shall be a merchandising executive capable of showing the dealer good merchandising practices and aiding the dealer in adapting those practices to the dealer's specific problems. Some factories already are seeing this. Several made gratifying changes in the last year. Those factories are being rewarded. The dealers are prospering. And lastly but perhaps most important, the customers of those dealers and the buyers of those cars are getting far better attention and results on maintenance than they were under old conditions. No improvements in merchandising or management can be made without in the end delivering a big result to the buyers and owners of motor cars."

#### APPERSON AT RECORD OUTPUT

KOKOMO, Ind., Sept. 11.—Production by the Apperson Bros. Automobile Co. thus far this year has broken all previous records of the company, according to a statement by N. H. Van Sicklen, vice-president and general manager. Introduction of the Apperson six-cylinder car and enlargement of the dealer organization marked the year's activities. More than 30 new dealers contracts are reported to have been signed in the last 30 days.

## Moline Plow Co. Segregates Stephens Automobile Factory

### New Corporation Will Be Formed to Manufacture and Distribute Its Products

MOLINE, Ill., Sept. 10.—Segregation and sale of certain properties of the Moline Plow Co. was decided upon by the directors at a meeting at Chicago last week. Among the properties of the company, sale of which probably will be undertaken, is the Stephens Motor Works which manufactures the Stephens automobile at Freeport, Ill.

This action is due to a new financial crisis in the affairs of the company, resulting in default of the Sept. 1 interest on \$12,459,937 of 7 per cent debentures. This interest also was defaulted last March 1, the first payment date following reorganization of the company.

A new corporation to operate the automobile company is to be organized with a capital of \$2,000,000, all owned by the Moline Plow Co. It is understood that an effort will be made to sell this property.

MOLINE, Ill., Sept. 8.—Property valued at \$200,000 has been formally transferred from the Moline Plow Co., Inc., to the Tri-city Malleable Castings Co., according to deeds recorded here this week. The ground is 450x600 ft., and is situated in East Moline. The Tri-city Malleable was recently organized to take over the foundry and castings plant and is just beginning production.

## Show and Association Heads in Two-Day Session in N. Y.

BUFFALO, N. Y., Sept. 8.—Automobile trade association managers from 20 cities between the Atlantic coast and Missouri held a two-day session here discussing promotion of motor vehicles sales by means of better shows and relief of inadequate and congested traffic conditions. The managers who were joined by a number of Buffalo dealers for part of the session were in attendance at the regular fall meeting of the National Association of Automobile Show and Association Managers.

Suggestions were made for working maintenance exhibits and exhibits of automotive departments of technical high schools as additional show attractions, for historical and highway exhibits as show features and for increases in the number of stripped chassis, cutout engines and other educational exhibits.

The meeting was presided over by Rober E. Lee, of the St. Louis Automobile Dealers' Association, president of the National, and Herbert Buckman of the Cleveland Automobile Manufacturers & Dealers' Association, vice-president. An exhibit of show promotion matter was arranged by Neal Adair, Editor of Motor World, secretary-treasurer of the association. The exhibit represented several cities.

The Association voted \$100.00 for the Red Cross Japanese Relief Fund.

## Japanese Disaster Has Little Effect on Automotive Trade

### Island Kingdom Not Yet Important User of Motor Vehicles, Having Only 20,000

NEW YORK, Sept. 8.—In a business way the Japanese disaster does not seriously affect the automobile industry, although a number of the big car manufacturers who are seeking export connections have been developing the possibilities of the Nipponese kingdom, while some of the leading tire companies have been doing well in the Island Empire.

Japan has not been a fruitful field for the automobile manufactures, largely because of the poor roads, there being fewer than 20,000 cars and trucks in operation in the entire country. Then, too, the high price of gasoline—from 65 to 85 cents—discouraged the thrifty Japanese so that many found it cheaper to hire their cars rather than own them. A good roads program had been prepared before the disaster which called for the expenditure of \$135,000,000 in 30 years in six of the leading cities, which would have greatly widened the automobile market there.

With three exceptions, all the automotive establishments in Japan were local sales, service or body building plants. The exceptions were the Yokohama and the Dunlop tire manufacturing plants and the Ford assembling plant maintained by Sale & Frazer, all of these being located in Yokohama and presumably destroyed. The Yokohama Rubber Co. is owned jointly by a group of Japanese capitalists and the B. F. Goodrich Co., of Akron, O. The Dunlop plant is a branch of the English company and is reported to have had an organization of 500 employees at one time.

The Ford assembly plant at Yokohama—operated by Sale & Frazer as the Ford distributors for Japan—probably has been destroyed, it is believed by officials of the company in New York, as it was located in a district reported to have been devastated. The extensive quarters of the company in Tokio also are believed to have been destroyed. The plant was erected about three years ago. It received cars and trucks in a partially disassembled state and prepared them for use. The capacity was about 50 vehicles a day, the recent rate of actual production having been about 10.

Three Americans were employed in the plant, which was under the management of K. Lewis, who had been in Yokohama for about three years. Eight or ten Americans in all were employed by Sale & Frazer, although some of these were connected with other activities of the company.

Officials at New York estimate that probably 5,000 or 6,000 Ford vehicles were in service in the two cities, with from 12 to 15 agencies selling Fords. Sale & Frazer also represented Hupmobile, Franklin and White in Japan.

The General Motors Export Co. is represented in Japan by A. B. Paddock, who had headquarters in Yokohama. He cabled from Kobe saying he was safe.

Sale of the Star and Durant lines in Japan was begun in June of this year, the distribution rights being given to L. J. Healing & Co., of Tokio. The agency for the city was placed, according to available information, with the newly organized American Japan Star Motor Sales Co. with sales station, garage and body building plant at Tokio.

## More Action Like This Would Help the Business

BUFFALO, N. Y., Sept. 10.—Complaint against the Allen Tire Co., 869 Main St., Buffalo, resulted in an investigation by the Buffalo Better Business Commission and a warrant for the arrest of David Chaitovitz, head of the firm.

Patrons complained that the company sold tires with a 10,000 mile guarantee, as Charles tires, which were merely rebuilt tires, wrapped to resemble new ones. Following an attempt by the Better Business Commission to secure an adjustment for a patron, the firm has moved to parts unknown.

### WILLYS BOARD REORGANIZED

TOLEDO, Sept. 8.—The Board of Directors of the Willy-Overland Co., has been reorganized by the election of C. O. Mininger, J. E. Kepperley and Thomas H. Tracy to the board, and acceptance of the resignations of Henry L. Thompson, chairman of board; W. W. Knight; F. A. Judson, vice-president; Charles E. Bunting and George L. Heater, all of whom have represented bank creditor interests for the last two years. Mininger and Rathbun Fuller will succeed Thompson and Knight as members of the executive committee.

No action was taken on issuance of any of the \$15,000,000 authorized bond issue.

## \$597,339,236 Total Ford Assets on June 30, 1923

### Financier Figures Profit Was \$43.32 a Car on Production of 1,833,812

DETROIT, Sept. 8.—Total assets of \$597,339,236, including cash, trade marks and good will of \$230,811,918 and merchandise and supplies of \$107,609,419, are reported in the balance sheet of the Ford Motor Co. as of June 30, 1923. At that time capital stock outstanding was \$17,264,500 and profit and loss surplus totaled \$414,129,158.

The reported as of June 30, 1922, showed total assets of \$409,820,133, including \$145,985,669 cash, \$20,517,986 good will and \$56,045,121 merchandise and supplies. Profit and loss surplus was \$289,935,296 and capital stock \$17,264,500.

Analyzing this latest balance sheet, Dow, Jones & Co. make deductions as follows:

"During the year ended June 30, 1923, Ford produced 1,833,812 cars, trucks, tractors and Lincolns. The increase in surplus over June 30, 1923, was \$124,192,862. After deducting \$25,000,000 estimated profits from the parts business and \$20,000,000 estimated "other income," manufacturing profits were \$79,192,000—or at the rate of \$43.32 per vehicle produced. During the preceding twelve months surplus increased \$133,248,000 and after deducting \$20,000,000 parts profits and \$15,000,000 "other income," there remained \$98,248,000 as manufacturing profits. The output for that twelve-month period was 1,080,000 vehicles, making the profit per car \$90.97.

"Gross profits for the June 30, 1923, year were probably \$160,000,000, compared with \$190,000,000 the preceding twelve months. This is arrived at by taking the \$124,192,862 increase in surplus and adding \$33,245,329 reserve for taxes and estimated \$2,000,000 increase in the depreciation reserve account."

## Comparative Balance Sheet of Ford Motor Co.

DETROIT, Sept. 8.—Ford Motor Co.'s balance sheet as of June 30, 1923, compares as follows with that of June 30, 1922:

Assets			
	June 30, 1923	June 30, 1922	
Cash	\$230,811,918	\$145,985,669	
Accounts receivable		47,255,625	
Securities	37,170,489	18,383,310	
Notes receivable		79,574	
Real estate, equipment, etc.	221,241,324	121,157,094	
Merchandise and supplies	107,609,419	56,045,121	
Prepaid expenses	506,086	395,754	
Good will		20,517,986	
Total	\$597,339,236	\$409,820,133	
Liabilities			
	June 30, 1923	June 30, 1922	
Accounts payable	\$52,472,217	\$42,307,570	
Employees' investment	17,164,351	11,903,500	
Accrued expenses	1,047,834	1,276,803	
Reserve depreciation	62,015,847		
Tax reserve	33,245,329	47,132,464	
Capital stock	17,264,500	17,264,500	
Surplus	414,129,158	289,935,296	
Total	\$597,339,236	\$409,820,133	



## Rural Dealers Take Many Cars in St. Louis District

### Local Federal Reserve Report Says Crop Prospects Somewhat Hurt by Hot Weather

ST. LOUIS, Sept. 10.—The statement on business conditions issued by the Federal Reserve Bank for the Eighth Reserve District states that business has gone along on an even basis for the past 30 days with firms reporting a generally satisfactory condition but with a seasonal slowing down in manufacturing and distribution.

Prospects for crops are not entirely favorable. The extreme heat has been detrimental to fruits and vegetables but large yields of main crops are expected.

Specifically of the automobile trade it has to say: "A feature of the month's business activities in the automobile trade was unusually heavy purchases of cars by country dealers for immediate delivery to customers. In numerous instances these cars were driven from the large distributing centers by the country dealer. \* \* The market for parts and accessories kept well abreast of that for new cars. \* \* The used car situation shows little change as compared with a month ago but in the large cities the number for sale has increased more rapidly than the demand. The tire market continues in an unsatisfactory condition. Further price cuts have disturbed the psychology of buyers and purchasing by both dealers and the public is on a necessity basis."

## \$144,284,402 U. S. Revenue From Motor Trade in Year

WASHINGTON, Sept. 8.—Reflecting an increase of \$39,850,639.91, excise taxes collected from automobiles and related articles, for the fiscal year ending June 30, 1923, aggregated \$144,284,402.66, as against \$104,433,762.75, for the fiscal year 1922, according to a preliminary report of Commissioner of Internal Revenue D. H. Blair.

Of the total excise taxes collected from automobile products for the fiscal year 1923, \$92,735,852.22 was derived from passenger automobiles and motorcycles, and represented the enormous increase of \$36,051,311.92 over similar collections for the fiscal year 1922. Collections from automobile trucks and automobile wagons amounted to \$10,677,907.17, an increase of \$2,273,349.32, collections from these sources for the fiscal year 1922, having been \$8,404,557.85.

Collections from tires, accessories, etc., aggregated \$40,870,643.27, an increase of \$1,525,978.60 over collections for the previous fiscal year, with a total of \$39,344,664.60. Revenue from passenger automobiles for hire amounted to \$1,899,205.88, for the fiscal year 1923, an increase of \$113,585.99 over the fiscal year 1922, when collections from this source were \$1,785,619.89.

Total collections of internal revenue

from all sources for the fiscal year 1923, aggregated \$2,621,745,227.57, a decrease of \$575,705,855.43 under total collections for the fiscal year 1922.

## Luelling Drives Mile in 43 Seconds on Dirt Track

SAN LUIS OBISPO, Cal., Sept. 8.—Fred Luelling driving a Frontenac Special made remarkable records for all one-mile dirt track distances from one to 60 miles when he won the San Luis Obispo Exposition Park main event of 60 miles on Labor day in 47 minutes 58 seconds. Harold Fredrickson, driving a Ford Special, took second, his time being 48 minutes 54 3/5 seconds. Fred Lyons in a Miller Special was third, John Fields in a Frame Special fourth and C. D. Evans in an Evans Special took fifth.

Luelling's time for the race was as follows:

1 mile	—43 1/5 seconds.
5 miles	—3 minutes 48 2/5 seconds.
10 miles	—7 minutes 40 seconds.
15 miles	—11 minutes 44 1/5 seconds.
20 miles	—15 minutes 50 1/5 seconds.
25 miles	—19 minutes 56 1/5 seconds.
50 miles	—40 minutes 5 1/5 seconds.

The race was held under sanction of the American Automobile Association and the Dirt Track Racing Association of California. E. H. Pendleton was official timer, using a special electric timing device.

## Liberty Motor Car Co. Sold for \$625,000 to Trustees

DETROIT, Sept. 10.—The plant and property both real and personal, of the Liberty Motor Car Co., has been sold to George J. Martin and Theodore A. Barthel, trustees, for \$625,000, subject to the confirmation of the court. The bidders represent the Columbia Motors Co., along with a group of creditors with claims totaling approximately \$1,000,000.

The Columbia Motors Co. will occupy the plant and will continue both the Liberty and Columbia lines. J. G. Bayerline, president of the Columbia Motors Co., states that a large part of the Liberty dealer organization will be retained, thereby increasing the Columbia sales organization and materially widening the distribution of both the Columbia and Liberty models.

### KYSOR RESIGNS FROM ACME

DETROIT, Sept. 8.—W. A. Kysor, who has been president and general manager of Acme Motor Truck Co., Cadillac, Mich., since its organization in 1915, has resigned and has been succeeded as general manager by C. J. Helm, who has been secretary and sales manager since 1915. Helm will continue in the office of secretary. Further announcement as to the election of a president and naming of sales manager will be made by the board of directors at a later meeting.

Acme Truck's position in the industry is regarded as very strong. It has made a creditable showing throughout the period of depression and is reported to be well situated as to finances. Its factory organization and distributing force are compact and complete.

## Sale of Templar Plant by Receiver Ordered by Court

### \$1,000,000 Mortgage on Cleveland Automobile Factory Held by Trust Company

CLEVELAND, Sept. 10.—The \$3,000,000 plant of the Templar Motor Co., in this city is to be sold to the highest bidder within 30 days. The sale will be made by the receiver, who has been operating the plant. The order for the sale was made last week by Federal Judge D. C. Westenhaver. The Guardian Savings and Trust Co. has a \$1,000,000 mortgage on the plant, which is a first lien.

The Templar plant and corporation came into existence during the hectic days of the war. It was a \$5,000,000 corporation and the stock was sold throughout Ohio and the middle West. During the war it made munitions for the Government and the first of a series of disasters came with the closing of the world's conflict. The Government owed the corporation a big sum for work done and did not pay for a long time. Then followed the days of 1920 with scarcity of materials and peak prices.

The company was caught with a big inventory when prices declined in 1921 and then came a long struggle by Fred Bramley, president, to obtain funds to tide the corporation over hard times. In that struggle Bramley was within sight of success when something unforeseen happened. When he stepped down and out his health was ruined, and he was forced to go to a health resort to recuperate. Stockholders lately attempted to raise sufficient money to take over the plant, but that effort was futile.

## Cars From Paris Salon to Be Exhibited at Astor Hotel

NEW YORK, Sept. 10.—Cars directly from the Paris Salon will be exhibited in the show to be staged by the Foreign Automotive Association, Inc., in the Astor Hotel, this city, Nov. 4-10, it is announced by Jan. H. Stelling, who is managing the exhibition.

Already 19 exhibitors have been booked for the initial display of this new association, of which 11 are foreign-built cars, four American and four body building concerns. Originally it had been planned to confine the show to foreign cars, but a change of policy was made whereby a few high priced American cars will be allowed in.

As the list stands now, there are listed the Benz, Fiat, Hotchkiss, Isotta, Lan- chester, Mercedes, Minerva, Panhard, Renault, Voisin and Steiger of foreign extraction; the Lincoln, Rolls-Royce, Brewster and Locomobile, American-built; and Brewster, Holbrook, Kellner and Rothschild, body builders. The Steiger, a German car, never has been exhibited in this country before. It is a \$4000 car, handled in this country by James Martin of New York City.

## State Suspends 415 Licenses for Reckless Driving in July

Connecticut Commissioner of Motor Vehicles Had Revoked 2180 Permits Up to Aug. 1

HARTFORD, Conn., Sept. 7.—In the opinion of the Connecticut commissioner of motor vehicles, July was without doubt the worst month for automobile accidents up to date. Says Commissioner Stoeckel, "A crisis in the control of motor vehicle traffic has arrived, requiring drastic action."

Ninety-seven drivers were required to surrender their licenses during July for driving while under the influence of liquor, an increase of 370 per cent over the corresponding period a year ago. There was an average of 60 automobile accidents a day resulting in two fatalities every 24 hours during the month, according to the commissioner.

During July the department suspended 415 licenses for reckless driving as against 162 in the same period in 1922. On Aug. 1 of this year, 2,180 licenses had been suspended for various reasons. Up to the same time last year but 631 licenses had been suspended. Fines for motor vehicle violations during July reached \$17,763.41 or about \$7,000 more than in July last year. Thirty-five automobilists were sent to jail in July for an average of twenty-three days each and twenty-seven were convicted for driving while drunk.

It is interesting to note that most accidents now occur on the state highways in the rural districts rather than within the city limits. During 1922 the situation was just the reverse. During the present year there have been only 714 accidents in the cities as against 1,090 in the rural districts. The city accidents resulted in a property loss of \$32,600.50 and in the injury of 198 persons.

## Standard Parts Co. to Do a Fade-Out in Court Sale

CLEVELAND, Sept. 11.—The \$20,000,000 Standards Parts Co., which was a creation of Christian Girl now in the automobile spring manufacturing business in Michigan, and which under his guidance rose to the proud position of being Cleveland's largest manufacturing establishment, employing thousands of men and supplying the leading automobile manufacturers with various parts, is about to dissolve into space.

That the gigantic corporation will soon be wound up after a long receivership was indicated here when A. V. Cannon, attorney for the receiver, filed application for authority to sell the last remaining plant unit of the corporation—The Standard Welding Co. Valuable machinery in the plant, office furniture and fixtures are to be sold in parcels if Federal Judge Westenhaver approves the application, as he is likely to do.

## Noted Driver Who Lost Life in Race



HOWARD WILCOX

ALTOONA, Pa., Sept. 8.—Howard Wilcox, winner of the Indianapolis sweepstakes in 1919 and a driver who has been a sensational performer for the past 15 years, who was killed in the opening event on the new track here, had not been active in competition for several years, although he drove in every Indianapolis event. Employed by James A. Allison, owner of the big Hoosier track, he was content to confine his racing efforts to the Memorial Day event. His appearance here was his first in the east since the Sheepshead Bay track days. Wilcox was one of the drivers developed by the National company some 15 years ago, when the team was composed of such celebrities as Johnny Aitken, Al Livingstone, "Sadie" Kincaid, Charley Merz and Don Herr. Kincaid and Livingstone met the same fate as Wilcox—killed in action—while Aitken died of pneumonia a couple of years ago.

### Industry Pays Last Honors

INDIANAPOLIS, Sept. 7.—The automobile industry of Indianapolis paid its last honors to Howard (Howdy) Wilcox today when the presidents and officials of several local concerns served as honorary pallbearers for the funeral of the daring pilot who lost his life on the Altoona track last Tuesday. The active pallbearers also were men who have long been prominent in automotive circles of Indianapolis. The honorary pallbearers were Harry C. Stutz, W. N. Thompson, George Dickson, Fred S. Duesenberg, T. E. Myers, Louis Chevrolet, Tom Rooney, Gil Anderson, W. G. Wall, Herb Miller, Mike Maroney, C. S. Crawford, Joseph C. Roach, Oren Chilson, and Captain Michael Glenn, while the active list included Eddie Hearne, S. C. Bohannon, Charles Merz, Don Herr, Seth Klein and Edgar Updyke.

## No Cause for Uneasiness, Says Federal Reserve Board

New Car Outlook Is Good But Used Cars Assume Threatening Attitude

WASHINGTON, Sept. 10.—There is no cause for uneasiness in the automobile industry on account of the current decline in production and sales, in the opinion of the Federal Reserve Board, according to its September survey of the automobile and other leading industries.

The Board's survey while optimistic as to the new car situation finds that "the outlook for the used car market is not so good and shows no improvement. Also the demand for tires is unsatisfactory and the production of tires and tubes, as well as shipments of tires, fell off rather substantially during the past month."

In summing up the new car situation the survey continues: "Although the July production of automobiles and trucks was smaller than that for any other month since February, it still exceeded the figures for all months previous to February."

"The output of automobiles during the first seven months of this year almost equaled the total for last year. Curtailment of operations at this time of the year is seasonal, and furthermore, is to be expected after such enormous activity during the earlier months of the year. Shipments of automobiles from factories were less in July than in the four preceding months but above those of all months in previous years. Distributors and dealers in the Chicago Federal Reserve district reported decreases in sales during July as compared with June, whereas in the St. Louis district increases were noted. In both sections business was much better than it was a year ago."

## May Take Sub-dealers in as Associate Members in St. Louis

ST. LOUIS, Sept. 10.—At a meeting of the St. Louis Automobile Dealers' Association to be held this month Robert E. Lee, secretary of the association, plans to submit a proposal to the membership to take sub-dealers into the association as associate members with all privileges of membership except the power to vote.

In this way Lee hopes to keep the small dealer lined up with the distributor in the recognition of the ethics of the profession and to prevent as far as possible any action on the part of the dealers outside of the association which might reflect discredit upon the whole organization.

### MOON SALES NEARLY DOUBLE

ST. LOUIS, Sept. 8.—F. H. Rengers, sales manager of the Moon Motor Car Co., reports that sales of Moon cars for the first eight months of 1923 are 92 per cent ahead of sales for the corresponding period last year.



## A. A. A. Will Ask Congress to Investigate Gasoline Prices

**Believes Suspicion of Fuel Industry Will Be Harmful to Motor Transportation**

WASHINGTON, Sept. 8.—The American Automobile Association has decided to ask the next Congress to thoroughly investigate the conditions surrounding the price of gasoline to the ultimate consumer, believing that "suspicion regarding the conduct of an industry which affects directly 60 per cent of the total population and indirectly every man, woman and child in the United States is an unhealthy condition which if continued, cannot help but retard the development of motor vehicle transportation."

President Thomas P. Henry of the A. A. A. declares that an investigation is necessary, for the fixing of a price which is not fair to the producer and distributor as well as the consumer does not solve the problem. He says:

"The request for a Federal investigation of the gasoline price situation made by the American Automobile Association does not necessarily mean Federal regulation. The A. A. A. feels that the present laws and agencies are adequate to handle the situation when the real facts are disclosed. However, should the facts warrant the further strengthening of existing agencies, it can then be determined by those fighting for a reasonable price on gasoline, just how far they desire to advocate Federal regulation."

"The motorist does not expect to buy his gasoline at a price which represents a loss to the agency furnishing it to him. He does expect to buy it at an equitable price, which the motorists in some states do not feel they have been getting in light of some of the recent disclosures. A thorough Congressional investigation will at least dispose of the suspicions and deductions which have been made as the result of the agitation started by Gov. McMaster of South Dakota."

## Electric Group Meeting to Be Held Sept. 11-14

CLEVELAND, Sept. 8.—The Summer meeting of the Automotive Electric Association will be held at Eaglesmere Park, Pa., Sept. 11-14, at which subjects of interest to members will be thoroughly discussed under the direction of President A. D. T. Libby. Committee reports on standardization, storage batteries, commercial ethics, patents, foreign service and advertising will be received.

This is a general meeting of all classes of members, only one of which is held each year. The official service stations of the equipment manufacturers will be represented and much good is expected to result from the joint meeting of the various interests.

General Manager Earl Turner reports that an extensive survey of facilities in

foreign countries for automotive electrical service has been made during the past few months and the question of improving and extending these facilities will be given lengthy consideration at Eaglesmere. Work on the code of commercial practice has been under way for some time and owing to the nature of the subject the present tentative code will be considered and revised for a more or less indefinite period.

## N. A. C. C. Questionnaire on Car Services

WASHINGTON, Sept. 10.—With a view of learning the varying services supplied by motor cars, the National Automobile Chamber of Commerce has directed an inquiry to thousands of motor car owners.

Judging by the growth of savings deposits and home building in States where there is the largest proportion of automobiles to population, investment in a motor car has been a profitable one. It will be interesting to get a picture of the various ways in which the motor car serves its owners.

The following are some of the uses already recorded:

1. Driving to and from work.
  - (a) directly.
  - (b) via railroad station.
2. Daily use in business.
3. Occasional use in business.
4. Evening driving.
5. Picnics.
6. Motor camping.
7. Long distance touring.
8. Driving to church.
9. Taking children to and from school.
10. Shopping.

## Murphy Third in Monza 500-Mile Race Won by Fiat

MONZA, Italy, Sept. 10.—Jimmy Murphy, veteran American race driver, took third place on the Monza speedway yesterday in the 500 mile race which was won by Salamano, an Italian, in a Fiat. Murphy drove a Miller Special. The Monza track is a figure-eight course, five miles in length, the crossing being on different levels.

The time of the winner was 5 hr., 27 min., 38 sec. Nazzaro in a Fiat was second in 5:28:02. Murphy's time was 5:32:41. The miles per hour average of the winner was 91.9, exactly one mile an hour faster than the average at Indianapolis this year. The cars were started by Premier Mussolini.

## ATLANTA TO HAVE SHOW

ATLANTA, Ga., Sept. 10.—Atlanta automobile dealers and accessory merchants will again co-operate this year in holding an annual fall automobile show in connection with the Southeastern Fair at Lakewood Park, Oct. 6 to 13. Officials of the association announced last week that space has already been taken for 75 exhibits.

## "Acceptable" Private Bid in Mitchell Sale Likely Received

**Receiver Announces That Sale at Auction Will Not Take Place Until Later**

MILWAUKEE, Wis., Sept. 10.—The strong intimation that an acceptable private bid is imminent in the affairs of the Mitchell Motors Co. of Racine, Wis., but the prospective buyers require a little more time to complete arrangements, is found in the announcement made Sept. 6 by Herbert F. Johnson, trustee in bankruptcy, that the public sale, scheduled for Wednesday, Sept. 12, has been postponed to a date which will be presently announced.

Some time ago it was announced that private bids would be received until Sept. 1, and if no acceptable bid was received, the entire property would be offered at public auction on Sept. 12.

Trustee Johnson maintains absolute reticence concerning the matter, but there is a strong belief current that prominent Racine interests have finally come to an agreement to take over the property and save the industry for Racine. It is also known that representatives of as many as six of the leading passenger car builders of the country have been in Racine in the past four weeks to inspect the plant and make a personal survey of the employment situation.

## King Motor Car Co. to Move to Buffalo About Sept. 15

DETROIT, Sept. 8.—King Motor Car Co. will move its plant to Buffalo about Sept. 15 and expects to be in production in that city by about Oct. 15. The company does not propose to make any change in models or prices incidental to the moving, but will continue its present lines in the new location. The company will have increased space in Buffalo and will operate on a somewhat larger scale than in this city, just how much larger, however, has not yet been determined.

Manufacturing will be suspended in the next week and will not be resumed until the plant has been completely moved. The company has a large inventory of equipment and material which it will move.

## OVERLAND PRICES REDUCED

TOLEDO, Sept. 8.—Willys-Overland Co. announces price reductions ranging from \$30 to \$65 on the entire Overland line. Following are the old and new prices:

Model 91		
	Old Price	New Price
Roadster .....	\$525	\$495
Phaeton .....	525	495
Coupe .....	795	750
Sedan .....	860	795
Chassis .....	425	395
Model 92		
Red Bird phaeton.....	\$750	\$695

## 2000 Fewer Cars Delivered in Detroit in July Than in June

**All Low Priced Lines Showed Falling Off, Ford Dropping From 2884 to 2484**

DETROIT, Sept. 8.—New cars delivered in Detroit in July showed a falling off of about 2000 from the June totals, according to the report of the Detroit Automobile Dealers Association. The totals for the two months were 5617 compared with 7505. Open car deliveries in July exceeded closed 3025 to 2592. Ford deliveries were 2484 evenly divided as to open and closed, a falling off of 400 from June.

All low priced lines showed a falling off, Chevrolet dropping from 1067 to 727. Overland had 195, Star 157 and Gray 49. Medium priced lines showed a severe falling off due to the many changes in models and inability to make deliveries. Studebaker was high with 281, Willys Knight second with 183; Hudson had 176; Essex 168; Maxwell, 155; Jewett, 154; Oakland, 97; Rickenbaker, 92; Dodge, 72; Buick, 66; Hupmobile, 65; Nash 56; Olds, 33; Reo, 26.

Packard led the high priced lines with 42; Cadillac had 23; Paige 20; Jordan 20; Lincoln 18; Marmon and Peerless 7 each; Wills Ste. Claire 6.

Truck deliveries fell off from 739 in June to 526 in July, the Ford total dropping from 467 to 350. Reo had 35; Dodge 19; and Chevrolet 16. In the light truck field, Federal led the heavy duty vehicles with 25; GMC had 13; Mack 9; White 8; Gotfredson 7; and Standard 6.

Tractors delivered in July were 14, doubling the June total.

## Select Themes for Discussion at N. T. D. A. Fourth Convention

NEW YORK, Sept. 8.—Themes for discussion at the fourth annual convention of the National Tire Dealers' Association, which will be held here Nov. 13-15, have been selected.

Based on the main subject, "What Is Wrong With the Tire Business," the dealers will discuss the following:

Are there too many manufacturers?  
Are there too many dealers?

To what extent are the business qualifications of a person looked into before receiving dealer consideration from the manufacturer?

Is spring dating an evil which might cause the disruption of the tire industry by overstocking?

Is the publication of list prices injurious to the tire business?

Should the tire business, in regard to prices, be put in the same classification as sugar or milk or other necessities of life?

Is the standardization of types and sizes of tires a needed factor to overcome over production by manufacturers and overstocking by dealers?

Is it important that manufacturers

secure fewer dealers and better dealers for the handling of the same make of tire?

Should tire dealers handle one, or more makes of standard tires?

## Dealer Makes Good as Mayor



A. M. PAONESSA

NEW BRITAIN, Conn., Sept. 10.—A. M. Paonessa, Hupmobile dealer at New Britain, has another job that keeps him pretty busy. He is the city's mayor and is administering the public affairs in such a way that there is widespread talk that he will be at the head of the municipal government for another year.

Notwithstanding his public duties, which consume a great part of his time, the Mayor has managed to sell more Hupmobiles this year than last.

## FIRE BURNS 40 CARS

BUFFALO, Sept. 8.—Forty automobiles were burned when the Albany garage, 409 Niagara St., this city, was swept by fire on Aug. 29. Exploding gasoline tanks on the automobiles helped to spread the blaze. The damage is placed at about \$50,000. Herman Weinstein, proprietor of the garage, recently spent more than \$1,000 in remodeling the garage. The machines destroyed were owned by persons who had them stored there.

Colton's Garage in Medina, N. Y., was recently destroyed by fire, with a loss estimated at \$35,000. Eight automobiles were included in the loss.

## RECOVER 500 STOLEN CARS

PHILADELPHIA, Sept. 8.—The automobile recovery squad of the city police department reports that 500 stolen automobiles have been recovered in Philadelphia since January 1. Since the first of the year 460 cars, valued at \$2,456,000, were stolen and more than one hundred cars were stolen in adjoining states. The detectives have arrested more than one hundred car thieves, 25 of whom were convicted and sentenced.

## September Starts Well After August Slump in New York

**Vacation Season and Anticipation of New Models Served to Slow Up Sales**

NEW YORK, Sept. 8. — Although August showed an appreciable falling off in sales over the previous month it maintained generally a better volume than August a year ago in the Metropolitan district. Aside from the seasonal slowing up of business due to the large number of people on vacations, the announcements of new models and rumors of new models contributed considerably to this condition.

What has served to lessen the force of the August depression in the sales curve has been the remarkably bright prospects for good business in September. This is true in all price classes. Public interest in new models has been strong and the establishments that have them on their floors are booking heavily for early fall delivery.

As was expected, the used car market slumped sympathetically. While the demand has been the weakest of any month this year, perhaps, the stocks of used cars in most instances are not heavy enough to seriously affect earnings during the remainder of the year.

There has not been much appreciable change in the truck market in the Metropolitan area. The demand has been fairly strong, especially for the lighter jobs, although many inquiries that are expected to materialize in sales in September and October have been reported.

## General Motors Sales on Increase Since Buick Coming

NEW YORK, Sept. 10.—General Motors' sales increased materially in August, as compared with July, according to the official statement issued by the big corporation, which reports 65,000 sales for its automobile units in August in comparison with 51,657 in July. This advance might be explained by the introduction of the new Buick models on July 1, since which time the Flint plant has been rushing production to the limit.

As reported, the combined sales in August of the American and Canadian passenger and commercial car manufacturing divisions is as follows:

	1923	1922
January .....	49,162	16,088
February .....	55,458	20,869
March .....	71,698	34,082
April .....	75,854	40,074
May .....	75,420	46,736
June .....	69,708	48,541
July .....	51,657	33,772
August .....	*65,000	42,840
September .....		35,443
October .....		40,815
November .....		50,232
December .....		46,871

\*This preliminary figure of sales includes Buick, Cadillac, Chevrolet, Oakland, Oldsmobile passenger and commercial cars and GMC trucks.



## Portland Dealers Complain of Receiving Cars From Factory Minus Much Equipment

20 Automobiles, Each Incomplete in Some Respect, Stand in One Store While 13 Customers Wait for Delivery

PORTLAND, Ore., Sept. 8.—Short shipment, making the dealer practically a finishing plant and involving labor charges of as much as \$40 a car, is a new source of expense for Pacific Coast dealers who complain that the situation is getting worse instead of better. The Portland Automobile Dealers' Association states that the record of one dealer handling a medium priced popular six shows the following shortage on one car: Four door handles, dome light, ignition and light switch, radiator cap, bumper, nicked windshield frame, robe rail, foot rest.

Each car in a shipment of six showed a shortage list of nearly that many items. The result is that this dealer today has orders for 13 cars on hand, has nearly 20 automobiles in his place and not one ready to deliver.

To deliver automobiles in that shape is sloppy merchandising that he doesn't care to descend to, and the result is 13 customers getting impatient about their automobiles and a dealer unable to bank his profit.

The worst instance on record is a shipment of automobiles sent out by a factory, without any wheels. The dealer unloaded the automobiles, dragged them up to his place and finally, in desperation ordered some substitute wheels from San Francisco. At the present writing he hasn't received the original wheels from his factory, although he has sold

and delivered some of the automobiles that came through that way.

Another factory lists a generous line of wheel equipment as factory standard and optional equipment. The dealer recently sold two cars specifying the larger size tires, often a favorite in the west, and now the factory states that they are out of that size wheel and don't intend to stock any more. Current advertising indicates that the sales department and the advertising department evidently don't get together very often, for the optional equipment which the dealer sold, but which the factory refused to deliver to him, is still being featured in the sales literature.

The parts situation has been bad all summer. If anything in the world hurts the dealer more than to have to tell his trade that he can't get parts from his factory, it is only that the factory has gone out of the picture entirely.

In a way this has been a blessing to the community in disguise and is one of the reasons why several lucrative businesses have been built up in parts manufacturing in the west. This is particularly true of springs, axles and pistons which are being made and sold in ever increasing quantities in the west. Formerly this situation applied only to the lesser makes, that is the less prominent ones. Today these western parts makers are doing their biggest business in supplying the demand for standard parts.

## 600 Illinois Dealers on Two Day Pilgrimage for Members

Leave Places of Business for Two Days to Recruit New Members in Nearby Towns

PEORIA, Ill., Sept. 8.—No finer demonstration of their faith and confidence in the Illinois Automotive Trade Association could have been imagined than the action of 600 members in leaving their business for two days on Thursday and Friday, Sept. 6 and 7, and devoting the entire time to securing new members in the adjacent territory. Thirty affiliated associations voted to take part in a drive that comprised the entire state.

In some instances, the dealers drove several hundred miles to make the rounds of the various cities, towns and villages, to call upon automotive dealers not previously allied and enlist their membership, in each case, this question was asked: "Do you believe in your business." Upon receiving an affirmative reply, each dealer was asked if he was willing to contribute to the success of a movement tending toward a better and greater automotive business, and to cooperate with other public spirited Illinois automotive merchants in an expanded state wide organization of the automotive interests through the medium of the Illinois Automotive Trade Association.

The men called upon, in most instances, recognized this personal call as an unusual compliment. The solicitors were busy business men, like those called upon. They received no pay. The trip was made at a great sacrifice of time and convenience. They contributed not only their time but their money to this cause, for they believe in the Illinois Automotive Trade Association and are genuinely concerned about its future. It represents in its personnel the progressive, alert, active firms, engaged in the automotive trade, who have the welfare of the industry at heart and who believe in any constructive movement that will upbuild it. Its board of directors is composed of aggressively interested automotive merchants, ready to sacrifice their time and lend their influence for the benefit of the industry. In short, the association is a federation of progressive men, behind which stand the foremost dealers' associations of Illinois, and a majority of the largest organizations engaged in the selling of automobiles and equipment in Illinois.

The association has been invaluable in supporting beneficial legislation and opposing that which was detrimental. It joined forces with kindred motor vehicle organizations in maintaining permanent headquarters at Springfield while the legislature was in session. Its results cannot but indicate to the thinking automotive tradesman, the essentiality of an organization, statewide in scope, that works unceasingly for the welfare of the industry and the common good of the individual member. Through its vigilance, the interests of the automotive dealers were safeguarded at all times.

## Boston Dealers Look for New and Greater Crop of Buyers

BOSTON, Sept. 8.—The hiatus in buying cars that hovered about some of the motor dealers early in August is disappearing. Now the distributors in Boston, and their dealers outside, expect to get a new crop of orders with the holidays out of the way. Some of the men handling the larger cars have many prospects who are on the way back to Boston and surrounding places after a tour of Europe, or a vacation out of town. With the 1924 models coming on the market they will have something to talk about.

The others handling the medium priced cars find that their sales, with a few exceptions, are going along at a steady gait. And those who have cars in and around the \$1000 field report that they are still behind in their deliveries of both open and closed models. When a distributor with a car new to the territory reports one dealer had 15 sales in the first 18 days; another 12 in the first two weeks; with others selling in proportion it shows the market is open. And the truck men report that they are doing very well.

### "SPAD" FOR OVERLAND

TOLEDO, Sept. 8.—"Spad" is the name selected for the Overland delivery car which will be in the hands of dealers some time this month. The letters stand for "speed, power and durability." The chassis will be identical with the present Model 91 chassis but the bodies will be Overland designed and will include several types. There will be 68 in. of loading space back of the driver's seat and a width of 44 in. inside. The express or panel types will measure 51 in. high at the sides and 51½ in. at the center. Prices are to be announced later.

### RECEIVER TO SELL DANIELS ASSETS

PHILADELPHIA, Sept. 8.—Announcement is made by Samuel T. Freeman & Co., auctioneers, that they will sell at a receivers' sale the plant of the Daniels Motor Co., of Reading, Pa., on Thursday, Oct. 4, at Reading. The sale will include the real estate, service rights and good will, machinery and equipment and stock and fixtures.

The same auctioneers will also hold a peremptory liquidation sale of the real estate, machinery and equipment of the American & British Manufacturing Co., of Bridgeport, Conn., on Oct. 1, 2 and 3.

## Nash Officials Consider New Factory Site at South Bend

### Indiana City Said to Have Made Overtures to Wisconsin Car Manufacturer

KENOSHA, Wis., Sept. 8.—A possibility that Nash Motors Company may find it expedient to move its factories from Wisconsin, was expressed today by Nash officials, following a report that the company was considering locating in South Bend, Ind.

It was stated that South Bend has made overtures to the Nash company and that W. H. Alford, vice-president of the Nash company, went to South Bend to look over the situation. So far, the Nash officials have not entered into negotiations with South Bend, it was said, and it was added that the company has no present plans for moving away from Wisconsin. It is known, however, that for some time the various taxes to which industrial concerns are subjected to in Wisconsin, have been considered burdensome by the Nash interests. In a statement today, C. W. Nash, president of the company, said:

#### "Anchor to the Windward"

"With conditions in Wisconsin as they are now, we must have an anchor to the windward. We must have something in view if Wisconsin conditions make it impossible or uneconomical for us to continue manufacture. You know these conditions as well as we do. They may force us to seek some new field and there are plenty of fields open. There are several progressive cities which would be pleased to make concessions to secure the location of the Nash plants. I am not ready to say that South Bend has made any such offer, but there are several cities which have assured us a plant if we will move to them. We have no present plans for moving away from Wisconsin, but we are closely watching the situation in Wisconsin and that is about all I would want to say. We have not dickered with the city of South Bend, but it is true Mr. Alford was there and looked the town over."

### NEW LINE OF TRUCK RIMS

AKRON, Sept. 4.—The Firestone Steel Products Co. has brought out a new line of interchangeable truck rims, standardizing on four sizes—5, 6, 7, and 8 inch—so as to be interchangeable on the present 6-in. felloe. The new rims, to be known as Type B, are being manufactured for 20-in. wheels in the 30x5, 32x6, 34x7 and 36x8 sizes, all of which will mount upon the standard 32x6 wood felloe band or steel felloe, using the same clamping ring, bolts, nuts and clamps. Type B rims also are being made for 24-in. wheels in the 34x5, 36x6, 38x7 and 40x8 sizes, all of which fit the 36x6 wood or steel felloe.

Instead of the inside flange being integral with the rim base, Type B rims have been made with two removable side rings, facilitating removal of the tire by applying pressure from either side

and permitting in case of injury the replacement of the ring only, instead of the complete rim as now is necessary. A high carbon spring-locking ring has been provided, which holds the tire securely and insures firm seating. The drive plates are of heavy type to withstand extreme circumferential strains.

## Many Dealers Fail to Turn in State Gas Tax

RICHMOND, Va., Sept. 7.—The bulk of the state gasoline tax collected from motorists on a basis of 2 cents a gallon prior to June 30, and 3 cents a gallon since July 1, has not been turned into the state.

As a result announcements have been sent to several thousand garage-men and gasoline dealers, notifying them that unless the tax was turned into the state treasury, suits for double the amount due would be instituted. Under the new Virginia law, gasoline wholesalers must in the future pay the tax, collecting it from the retailer, who in turn collects it from the motorist.

### SALES GAIN IN INDIANAPOLIS

INDIANAPOLIS, Sept. 8.—A distinct betterment in retail and state distribution sales began to be marked by mid August. During the last ten days the trend has been steadily upward both for local and state selling conditions. Local county fairs throughout Indiana where exhibits of cars have been held have brought exceedingly good sales records, and much more rural interest in new car buying than had been expected at these events. Some sales-managers who have made circuits of county fairs to date say that September and fall sales of cars will be double in volume over last fall. The bumper corn crop with strong price tendencies, and with hogs also going up will net Indiana farmers \$15,000,000 more than last year, even counting in the wheat losses.

New models and new prices have done their share in stimulating current sales and many dealers are finding it difficult to fill orders without making customers wait. The closed car market is in better condition than it has been this season.

### CLEVELAND HAS BEST AUG. SALES

CLEVELAND, Sept. 8.—Retail sales of automobiles in this city totaled 8,350 during August, according to figures obtained at the office of the county clerk, where new and used car sales are recorded, and at the automobile registration bureau.

It was the best August in the history of the trade in this city. Dealers interviewed, especially those handling cars that have been reduced in price recently, report a quickening of trade in the last week of the month. The sales were mostly new cars, the demand for used cars having let down some.

## Ford Plant at Los Angeles Doubles Assembly Capacity

### New Construction Prepares It to Turn Out 200 Complete Vehicles a Day

DETROIT, Sept. 7.—New construction at the Ford Los Angeles assembly branch has increased the capacity of that plant to 200 cars daily on which schedule it will start as soon as all new equipment is installed. Assembly at the present time is at the rate of 100 cars daily. The Los Angeles branch since the war has been devoted principally to manufacturing bodies and upholstery for the other Ford plants on the coast. This will be continued in addition to the assembly work.

New body ovens at the plant will have capacity for 60 closed and 100 open bodies every eight hours. New enameling ovens are also being added to take care of the entire branch production. Closed bodies will be furnished for the San Francisco branch territory. Eleven hundred men will be employed.

The Ford Northville plant in the Detroit territory is now turning out 85,000 car and truck valves and 10,000 tractor valves daily, employing 350 men working three eight hour shifts. The Hamilton plant of the company is now producing wheels in excess of 8,500 daily, setting a record of 8,684 Aug. 2 in the 16-hour daily period.

### NEW WISCONSIN CO.

GREEN BAY, Wis., Sept. 10.—Acquisition of the Oneida Motor Truck Co. of Green Bay, by a new \$500,000 Wisconsin corporation styled the Oneida Mfg. Co., has been accomplished with the consent of approximately 95 per cent of all stockholders. The new company will take possession immediately. Besides building the Oneida truck, it will manufacture gasoline railway coaches and cars and a line of wood and metal specialties. L. W. Melcher, who has been manager of the Oneida company for the past year, is at the head of the new corporation. In addition, the conditions of the purchase by the new company are that over \$500,000 of mortgage bonds against the original company will be cancelled, and bond holders will accept stock in the new corporation at from 50 to 85 per cent of the face value of their bond holdings, depending upon the classification of the issue. The new company assumed liability for all other outstanding obligations.

### CLOSE SHOP FOR PICNIC

CLEVELAND, Sept. 8.—Automobile sales rooms and distributing plants in this city will be closed on Wednesday, Sept. 12, when the annual picnic of the Cleveland Automobile Manufacturers and Dealers' Association will be held at Madison Golf Lakelands. Herbert Buckman, manager of the Manufacturers and Dealers' Association, is in charge of the arrangements for the picnic.



## CONCERNING MEN YOU KNOW

P. E. Akers, formerly manager of the Wichita, Kan., branch of the Firestone Tire and Rubber Co., has been appointed manager of the branch at Dallas, Tex.

Robert E. Lee, secretary of the St. Louis Automobile Dealers' Association and president of the Automobile Show Managers' Association, went to Buffalo to attend the meeting of the show managers.

Edgar L. Walsh has been appointed Superintendent of Service of the Walsh Motor Co., St. Louis, to fill a vacancy created by the resignation of S. L. Garvey, former service superintendent, who has removed to California because of his wife's health.

C. S. Williams, manager of the Ford branch in St. Louis, has announced the appointment of E. N. Hardy as assistant manager of the Ford branch, succeeding W. R. Johnson who has been authorized a Ford dealer in St. Louis.

Harry J. O'Rourke has been appointed manager of the western division of the Damascus Mfg. Co., in Chicago. This company makes the King brand of oils and greases and garage and service station supplies.

The Kissel Motor Co., of Atlanta, announces the appointment of R. B. Estes, who has been in the automobile business in Atlanta for some years, as manager of the Atlanta branch, to succeed C. E. Beckstrom, who resigned recently.

J. E. Hauser has been appointed district manager in charge of the office opened at 110 Eleventh street, Toledo, by the United States Electrical Tool Co., of Cincinnati.

Sam Samuels will handle the Eastern territory for the Pennsylvania Piston Ring Co., of Cleveland, covering the New England States and New York, New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia. R. C. Newton has been assigned to the Southwestern territory, embracing the States of Oklahoma, Texas, Arkansas and Louisiana.

Charles E. Bailey, formerly advertising manager and assistant sales manager of the Templar

Motors Co., of Cleveland, has been appointed sales manager of the Commercial Poster Co., of Cleveland.

W. C. Rayfield has resigned his connection with the Rayfield Carburetor Co., of Chicago, and has joined the sales force of the Johnson Carburetor Co., of Detroit.

H. J. Banta, factory representative for the Velie Motors Corporation of Moline, Ill., has moved to Des Moines. He will travel Iowa, Nebraska and both the Dakotas in the interests of Velie cars.

H. C. Smith, of Akron, O., has been appointed manager of the Milwaukee branch of the Mason Tire & Rubber Co., controlling Wisconsin and Upper Michigan territory. He was for nearly seven years with the Mason factory and in all has devoted 13 years to the tire industry.

Harry C. Reynolds has been appointed sales manager of the Clark-Turner Piston Co., manufacturers of Deluxe pistons.

G. D. Harris, vice-president and general manager, Wisconsin Automotive Corp., formerly U. S. Tractor & Machinery Co., Menasha, Wis., has resigned as general manager and will take entire charge of the sales department. Adolph F. Reinecke has accepted the general management and direction of works. The concern recently changed its name and announced that in addition to manufacturing the U. S. Tractor and tractor tools, it will build passenger cars, principally motor busses and large-capacity passenger hauling equipment, including trackless trolley cars, gasoline railway cars and coaches, and gas engine generating units.

L. T. Woods has been appointed sales manager at Norfolk, Neb., for the Overland-Nebraska company.

W. H. Kilpatrick, recently made assistant to the president of the Willys-Overland Co., has resigned and will take charge of the Chalmers plant at Detroit. He went to Toledo in March, 1920, and served through the reconstruction period of 1921 and 1922 at the Overland.

1051; Sao Paulo, 714; Barcelona 610. The total assembled abroad approximates 9000, leaving about 5000 shipped complete from the United States, these latter being included in the Department of Commerce figures.

### TO REORGANIZE GILLETTE CO.

APPLETON, Wis., Sept. 8—The stockholders' executive committee which is attempting to reorganize the Gillette Rubber Co. of Eau Claire, Wis., now in charge of a creditors' committee, met at the office of Dr. D. S. Runnels in Appleton and arranged to raise adequate funds for the acquisition of the entire property by purchase. The committee has been at work for nearly a year and reported that it has gained support from the stockholders in the movement to provide funds needed for a complete financial reorganization. The plant has been in continuous operation and has been working at full capacity all of this year on domestic and foreign orders for Gillette tires and by-products.

### 110,540 STUDEBAKERS THIS YEAR

SOUTH BEND, Ind., Sept. 8—No slowing in production in August was experienced by the Studebaker Corp., according to President Erskine, who announces that with 15,700 turned out last month the total for the eight months ended Aug. 31 was 110,540 cars, which is more than were manufactured all of last year when the total was 109,222. For the first eight months of 1922 the count was 78,369.

## Summer Price Cuts Cut Sales in South, Say Many Jobbers

### Public So Certain That Other Reductions Are in Store That Buying Almost Stops

ATLANTA, Ga., Sept. 10.—That the summer price cuts announced by tire manufacturers had the effect of generally demoralizing conditions throughout the south, and have materially injured sales in this district, is the opinion expressed by several of the larger tire dealers and jobbers of Atlanta, who state that the buying public seems so certain that further price reductions are in prospect that they are holding off their tire buying to the very last minute. The result has been a sudden dropping off in the sales volume which has lasted now for some weeks, and in many instances a 20 to 35 per cent falling off in the gross income of larger dealers, of which part is represented by the tire price reductions.

Without exception the larger dealers of Atlanta expressed themselves forcibly as strongly opposed to manufacturers advertising price changes in this manner, and especially in the very middle of the buying season. Invariably, they claim, such practice will have the effect of demoralizing the market and hurting business. At the same time the wholesale outlook over the district for tire sales is very good, due to the fact that retail dealers have the smallest stock in hand they have carried in months, and will have to make substantial purchases shortly if they are to continue in business.

## Good Prospects for Closed Car Business in Detroit

DETROIT, Sept. 8—Detroit distributors and dealers are looking for a good closed car business throughout the fall season, those dealers who are able to get the cars and make deliveries being in especially good position to get business. The season as viewed by dealers will be distinctly a favorable one for closed cars and efforts are being concentrated upon the development of prospects for cars of this type.

To further closed car merchandise the Detroit Automobile Dealers Association will hold its annual closed car show Oct. 6 to 13 in the new Thompson Arcade. Unusual crowds attended the closed car show held last fall and it proved an important stimulus to business. The closed car show this year, giving as it does the first opportunity to the public to see many of the new models, is expected to be a still larger attraction this year, with a consequent increase in actual business generated.

The used car situation in this city and cities of the state is declared good as a general rule, but there are some dealers who have become overstocked and are taking extensive losses to get out from under.

### MANY NEW GAS STATIONS

ST. LOUIS, Sept. 12—Competition in the gasoline dispensing business here has brought about the erection of numerous stations by the Standard Oil Co. and the Roxana Petroleum Co. When stations now under erection by the Standard Co. are completed there will be 63 Red Crown stations in the city and the Roxana concern will be close behind with 40, to say nothing of the numerous independent and more or less dependent stations in the community.

The price of gasoline has dropped to 15.9 cents here.

### DEALERS EXHIBIT AT FAIRS

BUFFALO, N. Y., Sept. 11—One of the most interesting features of the Erie fair held this week at Hamburg, near Buffalo, was the automobile exhibition under the immediate supervision of Carlton C. Proctor, executive secretary of the Buffalo Automobile Dealers' organization. Following the Hamburg fair the Buffalo Dealers' association will sponsor similar exhibitions at other county fairs to be held later in this end of the state and in northwestern Pennsylvania.

### FORD'S FOREIGN BUSINESS

DETROIT, Sept. 10—Total sales of Ford cars and trucks at assembly stations and sales branches abroad during July were 13,282. Totals at assembly branches were as follows: Manchester, 2734; Copenhagen, 2720 (this figure including 430 credited to the Cork, Ireland, plant); Buenos Aires, 1127; Bordeaux,

## BUSINESS NOTES

As announced by the Reo Motor Car Co., its balance sheet as of June 30 is as follows: Assets: Real estate, \$320,306; inventory goods, chattels and other tangible property, \$7,668,010; cash, \$5,426,714; value of credits owing to the corporation, \$5,792,376; buildings and equipment, \$5,378,246; deferred charges, \$31,559; investments, \$569,444; total, \$25,186,657. Liabilities: Common stock, \$15,000,000; liability on all unsecured indebtedness, \$3,171,889; deferred credits, \$9,224; dividends payable, \$1,022,406; surplus (representing net value of properties less outstanding indebtedness and paid-up capital), \$5,983,139; total, \$25,186,657.

Dodge Brothers' balance sheet as of June 30 is as follows: Assets: Real estate and machinery, \$22,317,699; merchandise, material and other tangible property, etc., \$13,433,676; cash, \$20,365,057; value of credits owing to corporation, \$10,496,900; Liberty bonds and other investments, \$8,454,001; total, \$75,067,333. Liabilities: Common stock, \$50,000,000; liability on all unsecured indebtedness, \$12,299,865; surplus (representing net value of properties, less outstanding indebtedness and paid-up capital), \$12,767,468; total, \$75,067,333.

The Monarch Machine Co., has just opened for business at 523 West McDaniel street in Springfield, Mo., and will specialize in automotive and general machine work. The members of the firm are James Pringle, H. L. Devore and Ernest Brandt, all of Springfield. New and modern machinery designed for accuracy and lowering of labor costs has been installed.

The F. & M. Fabric Co. has been organized at Middletown, Conn., and will manufacture textiles of all descriptions. John Feuler, formerly with the Russell Manufacturing Co., of Middletown, is the leading spirit in the new venture. He recently left the Russell company after 31 years of service.

Wisconsin Super-Traction Truck Sales Co., 216 West Water street, Milwaukee, distributor of the Super-Traction, six-wheeled truck made at Madison, Wis., by the Wisconsin Super-Traction Truck Co., has changed its name to Super Traction Co., and increased its capitalization from \$25,000 to \$100,000.

International Harvester Co., 217 Oregon street, Milwaukee, distributor of I. H. C. products made at the Milwaukee works as well as other plants of the organization, let contracts Sept. 1 for the erection of a 4-story fireproof building, 100x150 ft., at Reed and South Water streets, to be used for assembling, warehousing and shipping. The investment will be about \$200,000. W. J. Jens is local manager.

George Peterson, Ford dealer at Sturgeon Bay, Wis., who recently was granted letters patent on a new type of motor workstand, has organized the Peterson-Egeland Mfg. Co., of Sturgeon Bay, with \$50,000 capital, and is opening a factory to manufacture the fixture in quantities. It is

designed essentially to handle Ford engines in service stations, but is adaptable to any size engine. Dr. G. R. Egeland and H. L. Peterson are associated with George Peterson in the enterprise.

L. H. Dickinson and K. C. Larkey announce the opening of a new Rent-a-Ford business at 60 South Third, Memphis.

New accommodations for the Firestone Tire & Rubber Co.'s factory branch in Washington, D. C., have been completed, the branch having moved from 810 Thirteenth street, N. W., to Ninth street and Rhode Island avenue, N. E. The change in location from the automobile retail section of the city to the wholesale business section was made by the tire company in order to get out of the high rent district and at the same time to obtain more suitable quarters with railroad facilities.

Articles of incorporation have been filed in behalf of the Mid-West Automotive Accessories Mfg. Co., with headquarters in Green Bay, Wis. The capital stock is \$50,000. The principals are Ralph W. Davis, A. A. Brazeau and A. R. Klug.

The New Britain Machine Co., of New Britain, Conn., has moved its Detroit office from the Garfield Building to General Motors Building. Production machinery and screw machine products are handled for the State of Michigan through this office.

The Four Wheel Drive Auto Co., of Clintonville, Wis., has taken over the exclusive sale rights of the International earth boring machine. The boring machine will be sold as extra equipment and when attached to the FWD trucks is especially adapted for digging pole holes, power being supplied by the truck engine by means of a power take-off shaft.

The C. A. Dickerson Compressor Corp., of Buffalo, has been organized for the manufacture of garage equipment. C. A. Dickerson, president of the company, was formerly general distributor for the Gardner compressor and later engineer for the Wayne Tank & Pump Co. J. H. Ash, who is credited with developing the first turn-table jack, is chief engineer.

The American Chemical Paint Co., making A. C. P. rust removing and preventing chemicals, will occupy its new factory at Ambler, Pa., about Nov. 1.

The Mat Co., manufacturer of fiber mats for automobile running boards and tonneaux, is moving its factory from Muskegon, Mich., to Paducah, Ky.

At the annual meeting of the Hendee Manufacturing Co., which is to be held next month, the stockholders will be asked to approve a change in the name of the concern to the Indian Motor Cycle Co.

The Standard Steel and Bearings Incorporated has just completed moving its Philadelphia plant to the new location at Plainville, Conn.

### 50 CARS IN CARAVAN

NEW YORK, Sept. 11—A caravan of 50 cars, advertising the glories of California, will start from New York City on Sept. 10, headed for the Pacific Coast. The promoters of the caravan are Syl MacDowell and Warren K. Fryer, who are backed by the Chamber of Commerce Santa Monica. They have just completed the pathfinding trip in a Chandler from the Pacific Coast east, gathering recruits for the westward Journey. On the western trip the Chandler will be the pacemaking car and the itinerary calls for stops at Columbus, O., Indianapolis, St. Louis, Kansas City, Denver, Colorado Springs, Santa Fe, Albuquerque and thence to Santa Monica.

### GOOD CANADIAN CROPS

DETROIT, Sept. 10—Favorable crop conditions in Canada, combined with capacity operation in the wood pulp industry, and increased business in the iron and steel trades due to demand from railroad sources, indicates continuance and probable increase in automotive

demand, according to E. J. Weil, of the Cadillac Motor Car Co. of Canada. Decreased prices in Cadillac cars in this market, due to the locating of the Canadian plant, has helped increase Cadillac business in Canada to a large extent, he said.

### FALL SHOW IN UTAH

SALT LAKE CITY, Utah, Sept. 8.—An automobile exhibit will be a feature of the Utah State Fair in October for the first time in the fair's long history. The Coliseum is being remodeled to take care of the exhibit. Sixteen distributors have already announced their intention of being represented. There will also be a large accessory exhibit. Carl L. Snow, is to be manager of the new automobile section of the fair.

### 17 DEALERS EXHIBIT AT FAIR

HARTFORD, Conn., Sept. 7—Seventeen dealers are participating in the annual motor car exhibition at the Connecticut State Fair which opened for a week's run at Charter Oak Park, Labor Day.

## Sales of Nash Cars Greater in August Than in July

### President of Company Tells Dealers Prospects Are for September Business to Be As Good

MILWAUKEE, Wis., Sept. 8—All precedent has gone by the board, all accepted theories are being shattered, by the tremendous volume of sales by the automotive industries of America during August, a condition that doubtless will proceed through September, in the opinion of Charles W. Nash, president Nash Motors Co., Kenosha, Wis., expressed before the distributors and dealers of Wisconsin and Northern Michigan at the semi-annual conference held in Milwaukee during State Fair week.

"It is difficult to account for the fact that this year the public has been buying as many cars in August as in June and July," Nash said. "August usually is a 'low' month in this business. According to all tradition, there should have been a marked falling off in August purchases. Yet our company sold more cars in the month than it did in July, and indications are that more will be sold in September than in August. This applies to the industry in general. Only once before, in 1920, was there a similar excess in sales volume during the late summer months.

"A remarkable fact is that farmers, who are supposed to have been hard hit by poor crops or low prices, are buying our cars. It is probably one more proof that the motor car has become a real necessity and is not a luxury in modern life."

Nash said business conditions in general throughout the country were never better than at present, with bright prospects for the future.

He told Nash dealers that the present day trend in motor car manufacture should be toward standardization of body line and general appearance. He said that a man who buys a car today should be in less danger than formerly of having his car rendered antique in appearance in almost a day by radical changes and departures in body designs.

Nash shipments from Jan. 1 to Aug. 15, this year, were reported to have been in excess of those made in the entire calendar year of 1922.

### WILLS SEES GOOD BUSINESS

DETROIT, Sept. 8—Fall business prospects are very good according to C. H. Wills, president of Wills Ste. Claire, Inc., and the company is rounding its distributor and dealer organization to take full advantage of it. Since the formation of the new company, Wills said, executives have been outlining plans for fall and spring business and these are now becoming effective. Due to seasonal conditions and to circumstances incident to the changes in the company, schedules have been reduced up to now but are now being expanded until complete operation is reached.



## IN THE RETAIL FIELD

The Rickenbacker has entered the field at Memphis through the Rickenbacker Memphis Co., at 1017-21 Union avenue. V. W. Heffernan is president and manager of the company.

The Cadillac Sales Co., of Knoxville, Tenn., capital \$50,000, has amended its charter changing style to J. C. Mahan Motor Co.

The home of the Packard automobile in New Orleans will be at 1400 St. Charles avenue after Oct. 1. This announcement is made by Ginder Abbott, president of the Abbott Motors, Inc., Packard distributor in the New Orleans territory.

The parts department of the Chambers and Long, Inc., downtown St. Louis Ford dealer, has been concentrated in the front of the entrance to the showroom and the parts are displayed in steel bins under a glass show case. Chambers & Long have also instituted night service and run their repair force in two shifts which respond to trouble calls much after the fashion of the fire department.

W. L. Shellabarger, Decatur, Ill., distributor of the Studebaker car in the Macon county territory for many years, has given up that line and will handle the Nash.

The Diesing Motor Sales Co., St. Louis, Rickenbacker distributor, has leased a large one-story automobile building at 3617-25 Washington boulevard where the company will concentrate its entire business. Heretofore the company has occupied the western half of the building and maintained its offices, service station and a portion of its sales and service in a large building at 3929 Laclede avenue.

The Eliason Motors, Inc., Chestertown, Md., has incorporated with \$100,000 capital stock to deal in automobiles, tractors, etc.

The Kidd Motor Car Co., formerly of La Salle, Ill., recently organized to distribute the Dodge Bros. car at Bloomington, Ill., has been incorporated with capital stock of \$10,000. The company has opened an agency at 405-7 West Washington street, Bloomington.

W. H. Starkey, of Wood River, Ill., has been appointed dealer for the Ford in Moberly, Mo. He succeeds C. T. Christen and A. V. Gibbons, who sold out their interests in the Ford agency here and have moved to St. Louis. Starkey had been conducting a successful Ford agency at Wood River.

Allen L. Townsend, of Houston, Tex., has purchased the entire interest of the Townsend-Varnier Nash Co. at Houston and has changed the name of the company to the Townsend-Nash Automobile Co. Townsend is now president and general manager of the company.

C. W. Cope, of Onawa, Ia., has purchased the business of the Glen Edwards garage in that city. Frank A. Hafer has taken the agency for the Chevrolet at Geneva, Neb.

Otto Wilson, of Waterloo, Neb., is now handling the Chevrolet in his town.

Baldwin & Colglazier have taken the agency for the Durant at Falls City, Neb.

I. N. Dempsey, of North Platte, Neb., has taken the agency for the Studebaker in his territory.

B. L. Anderson, of Fullerton, Neb., has leased a garage and will handle Overland cars and parts.

V. Greenfield, of Osceola, Ia., has taken the agency for the Maxwell and organized the Maxwell Sales Rooms.

Watson & Son, of Emerson, Neb., have taken the agency for the Star in their territory.

P. J. Peterson, of Kearney, Neb., has taken over the sales and service of the Dodge.

The Easton-Taylor Auto Sales Co., St. Louis, has opened a new building at 4464 Easton avenue. The company will conduct a garage capable of housing 75 cars and will sell and exchange new and used cars, tires and parts. Theodore Porter is manager.

F. J. Grace has joined the Overland Trail Tire & Rubber Co. of Omaha as general sales manager.

Joe Schlegel has opened the D. L. D. garage at Milford, Neb.

The Red X Garage at Minden, Neb., has changed hands and is now known as the Bauer Motor Co. C. J. Bauer is the new proprietor.

E. Canning & Son have taken the agency of the Dodge cars at Albia, Iowa.

The Fairchild Motor Co., Kearney, Neb., has been appointed authorized Ford dealer.

M. S. Hutchinson, of Odebolt, Ia., has secured the agency to handle the Paige and Jewett in Sac county.

The Herrick Motor Co., of Waco, Tex., has been awarded the franchise for the Chevrolet cars in Waco and immediate vicinity.

Heatley & Clark, a new automobile firm at

Fort Worth, Tex., will handle the Gray car in the Fort Worth territory. The firm controls 41 counties including such cities as Waco, San Angelo and Wichita Falls.

To rent, hire, sell and deal in motor vehicles, the Drive-It-Yourself Co., Inc., 1723-5 North Charles street, Baltimore, has been incorporated with \$30,000 capital stock by Philip and Maxwell Milstone and James V. Alsop.

Work of remodeling the large building at 1100 Cathedral street, Baltimore, for use by the Crouch Auto Company, headed by Harry M. Crouch, who is well known in the trade, is proceeding at a rapid pace. When completed the showroom will be one of the most attractive in Baltimore. The Crouch Auto Company is an associated dealer in the Reo line.

The Baltimore Motor Vehicle Exchange, 1804 North Charles street, Baltimore, has been incorporated with \$100,000 capital stock to buy, sell and exchange new and used motor vehicles.

Stark and Meyers have opened a new repair shop at Polk, Neb.

The Valley Inn Buick Co., Neenah, Wis., has been incorporated for \$25,000 by Leslie H. Bleecker, Howard P. Buck and John O. Kuehl to continue the local Buick franchise.

Eben Thompson, Ladysmith, Wis., has sold his interest in the R. J. Clark Auto Co., of the same city, to R. J. Clark, and has acquired the entire business of the Theo. Frykland Auto Co. at Prentice, Wis., taking possession Sept. 1.

Blackhawk Motor Co., 1501 Monroe street, Madison, Wis., has been granted the Hupmobile franchise.

Woodside-Pappe Motor Co. has been organized in Milwaukee by Francis Woodside, Aldrich Pappe and C. E. Henderson. The capital stock is \$50,000.

E. G. McDonald, Ladysmith, Wis., has been appointed dealer in the Hudson and Essex and also the Packard.

R. D. Rockstead, 2713 Grand avenue, Milwaukee, state distributor of the Lexington, Gardner and Earl, has also taken the Wisconsin distribution of the Apperson.

The Kurz Motor Car Co., Appleton, Wis., has purchased a large building at College avenue and the Soo Line tracks and after rebuilding it as a garage and sales room will erect an 80-foot addition at the rear for service and repair shop purposes.

Erwin D. Wirth has been appointed sales manager of M. D. Newald & Sons Co., Milwaukee, distributor of the Stewart truck.

Among new distributors for the Auburn car are: Barger-Mitchell Motor Co., 1702 Madison avenue, Toledo, O., and Whitney Garage Co., Inc., Gouverneur, N. Y.

The following have been appointed as dealers of the Nash car: McCormack Bros. Motor Car Co., Inc., Birmingham, Ala.; J. M. Hightower, Sylacauga, Ala.; Seligman Garage, Seligman, Ariz.; Old Trails Garage, Kingman, Ariz.; Flagstaff Garage, Flagstaff, Ariz.; Tom A. Little, Blytheville & Dell, Arkansas; Ward Motor Co., Corning, Ark.; Charles H. Power, Woodland, Calif.; O. M. Cloyd, Yreka, Calif.; The Brick Garage, Dunsmuir, Calif.; Pacific Nash Motor Co., 938 Van Ness, Fresno, Calif., and the Standard Garage, Broadway and A street, Turlock, Calif.

The Andrews Chevrolet Co. is a new company organized to handle Chevrolet cars in Des Moines, Ia. Mr. Andrews, manager of the concern, has been in the automobile business at Davenport, Ia., for the last five years.

The Wagner Automobile Co., 13th and Locust streets, Des Moines, Ia., has been granted a franchise for the distribution of Velie cars in Des Moines and surrounding territory.

The Bronx Peerless Co., Inc., with commodious salesrooms at Grand Concourse near 180th street, Bronx, New York City, under the direction of Vice-President and General Manager James T. Martin, for the last two and a half years with the Roamer Motor Car Co., of New York, has taken on the exclusive sale of the Peerless 8 in the Bronx district.

The Walker Upson Motor Car Co., 277 Connecticut boulevard, East Hartford, Conn., has taken on the Flint for Hartford county.

The Bennett Hartford Co., 345 Connecticut boulevard, Hartford, Conn., has removed the sales quarters to 256 Main street and the service department to a new building on John street. The firm handles the Ford and Lincoln in Hartford and vicinity.

Apperson Bros. Automobile Co., of Kokomo, Ind., announces appointment of the following dealers: F. J. Thomas and A. Luther Smith, Greensburg, Pa.; J. D. Dowdell, Beaver, Pa.; Louis J. Belloff, New Brunswick, N. J.; F. W.

Viscount, Johnstown, Pa.; A. C. Jones, Rockland, Me., and W. A. Stiles, Fort Madison, Ia.

Brown-Sexsmith Motor Co., Oshkosh, Wis., has been granted a Gray franchise. It will continue as Chandler and Cleveland dealer.

South Superior Motor Co., 5822 Tower avenue, Superior, Wis., has been appointed Packard dealer in all of Douglas county.

A. M. Bailey Co., Jefferson, Wis., is a new corporation with \$50,000 capital organized by Alfred M. Bailey, Fred M. Wilcox and E. B. Bailey to deal in the Ford and Lincoln in Jefferson county.

W. H. Collins, Fond du Lac, Wis., has resigned from the Wisconsin Auto Sales Co. of that city to accept appointment as Packard dealer for the county. New headquarters have been established at 24-26 Third street.

Downey-Recht Motor Co., Inc., Kenosha, Wis., a new corporation, has taken the Chevrolet franchise for Kenosha county. It has acquired the sales and service building at 216-218 South street, formerly owned and conducted by the Kenosha Motor Sales Co. as Dodge Bros. headquarters. William J. Downey is president; Victor Recht, vice-president, and Maurice Froelich, secretary-treasurer. Roy Blair is service manager.

Bailey Motor Car Co., 2525 State street, Milwaukee, Ford and Lincoln dealer, has installed additional equipment in its service station, including a cylinder boring machine.

R. W. Motor Car Co. has been incorporated at Jefferson, Wis., with \$30,000 capital by Theodore B. Roach, Edward C. Wolfram and Herbert E. Wolfram, all of Watertown, Wis.

The Chevrolet-Nashville Co., according to A. W. Davis, manager, has awarded the contract for construction at 504 Broadway of a new home for the company, to represent an investment of about \$50,000. The building will provide 25,000 sq. ft. of space.

The Smalley-Chevrolet Co., of Knoxville, Tenn., moved into its new home on North Gay street Sept. 1, this being the fifth new building constructed this summer in Knoxville for automobile distributing agencies. The Gray Motor Co., of Knoxville, is also establishing a new branch in North Knoxville, which will be occupied shortly.

New automobile agency companies formed in the southeast the past two weeks include the T. & S. Motor Co., of High Point, N. C., with \$50,000 capital, and the Park Motor Co., of Avon Park, Fla., with a capital of \$20,000.

The Gainesville Buick Co. has been organized at Gainesville, Fla., with \$30,000 capital, and has taken the Buick franchise for that section of the state. Officers are T. B. Stringfellow, president; John C. Dial, vice-president, and J. B. Stringfellow, secretary and treasurer.

The Denmark Buick Co. has been organized at Denmark, S. C., with a capital of \$20,000, and has the Buick franchise for that section of South Carolina. Officers are C. F. Rizer, president; M. E. Rizer, vice-president, and G. M. Neeley, secretary and treasurer.

The McCusker-Foulks Co., 441 Jackson street, Milwaukee, has taken occupancy of its new sales and service building at 235 Cambridge avenue, where the sales and service departments have been consolidated. The firm is Chevrolet dealer and the owners are J. William McCusker and John W. Foulks.

The Chester 13th Motor Sales Co. has been chartered at Cleveland, O., with an authorized capital of \$10,000 to buy, sell and deal in automobiles.

The Wright-Hoy Motor Co., of 408 1st street, Toledo, O., has been chartered with an authorized capital of \$10,000 to buy, sell and deal in automobiles, parts and accessories.

Freeman & Sons, Inc., is the name of a new independent garage company formed this month at Miami, Fla., with \$100,000 capital.

River Falls Motor Co., River Falls, Wis., is a new Wisconsin corporation with \$10,000 capital organized by J. F. McDonald, M. E. Gutzler and P. W. Gutzler.

Henry Kassner has sold his garage and repair shop business at Kewaunee, Wis., to John M. Barta, proprietor of the World Tire Shop in the same city.

The following dealers have taken on the Auburn line: Fulton County Motor Co., 26 Washington street, Gloversville, N. Y.; Weiler & Jackson, 62 Weir street, Taunton, Mass.; Service Auto Shop, 2412 Saginaw street, Flint, Mich.; Ray R. Proffitt, Pana, Ill.; S. T. Syra, Kanapolis, Kan., and P. M. Collins, Peotone, Ill.

Among new Nash dealers are the following: Clous & Nuss, Windsor, Colo.; City Garage, Carbondale, Ill.; Dellamano Bros. Motor Sales Co., Collinsville, Ill.; Long & Mossman, Iowa Falls, Ia.; Hooper Motor Co., Chariton, Ia.; Glen W. Michael, Lawrence, Kan.; Nash Hemme Motor Co., Kansas City, Kan.; Baer Bell Motor Car Co., 119 W. Broadway, Newton, Kan.; H. W. Fellers, Hays, Kan.; Jenkins Nash Co., Jenkins, Ky., and Crawford, Jenkins & Booth, Ltd., Shreveport, La.

# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### How a Growler Tests Armatures

1—Explain the principle on which a growler operates. Does the armature revolve or does it have to be revolved by hand? We have seen machines for testing armatures which were made up of laminations forming just one pole, the armature to be tested being put on a stand near this pole. Alternating current was then used through the winding on the pole and a piece of iron was held near the armature. The armature was then revolved and when a coil that was shorted came near the magneto or pole the iron would vibrate. Is this on the same principle as the growler?

1—We are not familiar with the device you described and would appreciate having the name of the maker. From your description, however, it appears to have the same general operating characteristics as a growler.

2—On a regulation growler made up of H-shaped laminations would the armature have to come exactly between the poles? Would the growler act in the same way if the diameter of the armature was so great that it would not go between the poles? Would the same kind of a growler or the same size growler work for an armature no matter whether it was wound for a two-pole, four-pole or six-pole machine? Would the lines of force cut through these differently wound armatures so as to give results in either case?

2—Growlers are usually made with the pole pieces curved or else beveled at an angle of about 45 degrees so that there can be considerable variation in the armature diameter and still have it make contact with the 45 degree surfaces. This means that on a growler of this type that the magnetism enters at points approximately 90 degrees apart on the armature circumference.

In the operation of a growler no very great accuracy is apparently necessary. The alternating current in the winding causes an alternating condition of magnetism to surge back and forth through the armature. Perhaps most of the lines of force go through the lower part of the armature, which is the shortest path from one pole of the growler to the other. They will, however, cut through some or all of the armature conductors, the strength of magnetism, of course, being greatest at that part of the armature which is nearest to the growler.

With a good armature there is a symmetrical condition in the voltage produced. That is, a wire on the left side of the armature will have a certain voltage and the corresponding wire on the right will have the same voltage so that the wires pair off. The voltage in any one coil cannot send a current unless it can send it through all the rest of the windings. (If you will trace out most any armature diagram you will find that you have to trace through all of the coils to get back to the first coil).

We accordingly find that any one coil

### The Readers' Clearing House

**THIS** department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

by itself cannot have a current flowing as a result of its own voltage without sending it through all the other coils. When this would apparently happen, we would find if it were possible to check up all of the voltages that they would cancel out. That is, we would have as much voltage trying to send the current in one direction as we would have trying to send the current in the other direction so that no current would flow.

When, however, a coil is shorted or connected to itself at the commutator bars the condition is quite different, for any individual coil can then send a little local current and this local current produces a little local condition of magnetism. It is this little local magnetism that is produced by the shorted coil which is used to operate a hack-saw blade to make it flutter up and down to act as a detector in finding the defective coil.

When testing an armature on a growler for the first time it would do no harm to put an artificial short between two of the commutator bars by wedging a piece of copper wire between them and

then turn the armature in various positions and try the hack-saw blade with the shorted coil in different positions to see where the greatest effect is obtained. The artificial short could be removed and the armature slowly turned by hand with the hacksaw blade kept in the same relative position. The turning of the armature is not for the purpose of generating a voltage, but merely to get different coils in the required position for testing and the best positions can be determined more easily by experiment than by calculation.

3—How are phones used in connection with a growler?—A Reader.

3—The phones are used by taking the two connections and putting them on adjacent commutator bars while the armature is in the growler. The change in magnetism previously referred to produces a voltage which will show up at the commutator bars, this being an alternating voltage. This will send a current through the phones, which will produce a buzzing noise. In doing this it will be necessary to make a test with the test points always in the same relative position. By this we mean that the test points should always be at the top of the commutator or always at the side or always at 45 degrees in the vertical position so that similar results will be obtained.

In making tests of this kind, if the noise is the same at all pairs of commutator bars, it shows that the armature is probably o. k. A short circuit, however, between commutator bars or between the connections to the bars in any coil, will very much reduce the voltage of that coil and give a very low buzz. On the other hand an open circuit may connect several coils to the phone and give a very loud buzz. In this way variations due to shorts and opens may be detected.

### TYPES OF VALVES IN GASOLINE ENGINES

Q—Has there ever been any other valve invented for gasoline engines which is at all practical, other than the "poppet" and "sleeve"? Where can we get some information regarding experiments made along that line?—Eddins Motor Company, Marlin, Tex.

There has been much development work on rotary valve engines, but at the present time we know of no rotary valve engine that is being manufactured. There are one or two makes being built that use piston valves. The piston valve apparently is practical. Information regarding development work and on patents can be secured by writing to the patent office and if you wish books dealing with the development work we would advise that you communicate with the U. P. C. Book Company, 239 W. 39th St., New York.



### Architectural Service

IN giving architectural service, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

## Attractive Garage Will Make 'Em Stop

Q—We are in receipt of your favor of July 25th and replying to same we will try to give you in detail just what we have in mind regarding the erection of a new garage.

You will note from the attached paper the size and location of our lot in town. We desire to utilize this space to the best advantage possible, using the full front of the lot, 60 feet, for the width of the building. The width of the building, as stated, will be 60 ft. by 100 ft. long, single front. Here you may give us a suggestion as to which would be less expensive and more suitable, and whether or not a porch effect on front, covering filling stations, etc., would add to or take from the appearance of our building. In either case we desire it to be as attractive as possible and something unusual for a small-town garage.

As you will also note, our lot is located in a small village at the end of the state highway, having a vacant lot on one side. However, a building will be erected on this lot within the near future.

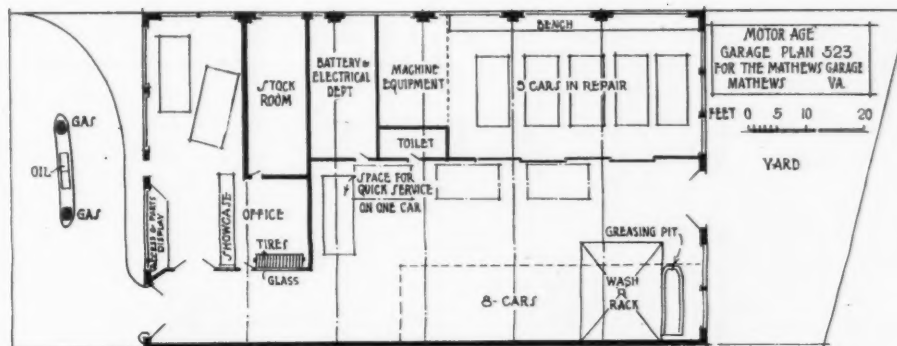
Our building will be built back far enough from the road to give ample space for filling station, air and water in front, with a semi-circle driveway. We would like to have the interior so arranged as to have our stockroom, showroom and office taken care of by as small a force as possible, putting the larger part of our force in the rear, which will comprise a private workshop, battery and electrical department, burning-in machine, washstand and grease rack for cars, storage space for cars, sink and toilet, etc., washstand and grease rack for cars to be installed in space for storage.

In making a sketch of this building, we would like for you to give us the size and dimensions of each of the above spaces, using their proportionate part of the entire floor space. In addition to the above, we need a work bench on the side, as shown on our sketch, so as to get the benefit of sunlight.

As we are anxious to get started on this work, we would appreciate prompt and careful attention.—The Mathews Garage, Mathews, Va.

The layout shown in our plan number 523 is the best solution of your problems that we can devise.

By placing the entrance at the side of the building the cars stopping for gas service will not interfere with other cars entering to any great extent. The showroom, while it is rather small, will very nicely hold two cars, and the combined office and accessory store will cut down the number of necessary employees to the limit. There is space along the side walls which includes the wash rack and greasing pit.



The shop is at the other side of the aisle with folding doors so that each car that is taken into the shop will not interfere with any of the others as it enters the door. The space just back of the office is a convenient little corner for giving quick service, since a car standing here will not obstruct the aisle.

We judge from your sketch that the south side of the building is open and consequently we have placed windows all along this side. If this is not the case, however, it will be necessary to install skylights to give light to the stockroom, battery room and machine shop.

### CARBURETION AND GENERATOR ON REBUILT WHITE

Q—We have rebuilt in our garage an old White car No. 5246. We have reground the cylinders and fitted DeLuxe pistons, Trindl pins, renewed all over with Ahlberg bearings and have fitted a special Morton Brett body, so you can see we have depended on your advertising columns very closely. The job is finished and is very smooth and seems fairly fast, although not worn in enough to give it the maximum speed. Now I would like a little information, first, about the carburetor. We have in mind a Master, but do not feel as sure as I should like to with this motor. We have a vacuum system, so that we can shorten up the manifold if you think this would help. We would also like to know the gear ratio in third speed and the gear ratio in fourth speed.

1—The number you have given is the engine number and, according to the White agent here in Chicago, the serial number is needed in order to trace the car and find out what gear ratio it had. However, even having the serial number, they would not be able to give the information if the car was not sold through the Chicago dealer. We would suggest that you find out the gear ratio by jacking up one rear wheel and turning the engine over by hand with the gears in mesh until the rear wheel which is spinning makes two revolutions. Then the number of turns that you have given the starter crank will be the gear ratio. You can do this both in third and fourth and find out the ratio with a fair degree of accuracy.

The reason for having the wheel which is jacked up turn around twice is that with the other wheel on the ground, the one in the air goes twice as far. It is the equivalent of pushing the car along the road until both wheels have made one revolution.

2—We have discarded the old Entz generator and starter and we have a Gray & Davis six-volt generator that we contemplate using for lights and horn. We can run this generator with a Whitney chain right off of the magneto driveshaft and it seems to fit in there very nicely. Can you foresee any trouble in installing this, or would you recommend putting the old Entz generator and starter back on again? —Geo. Kossuth, Park View, Wheeling, W. Va.

2—In regard to the electrical changes,

believe that the Gray & Davis generator will be o. k., assuming you do not wish to have a starter, and merely wish to have the generator charge a small battery for supplying current to lights and horn.

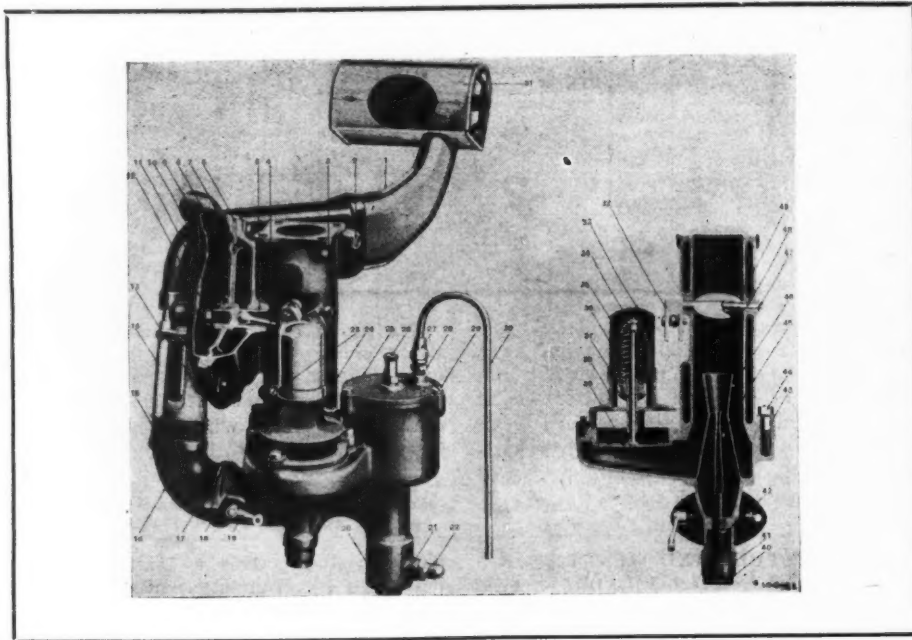
You do not state whether the generator is one having third-brush regulation for the generator output or whether it has a bucking series field. With the series field type of generator you cannot vary the output and if it is this type we would suggest you making a test of the generator on a bench to see at about what speed you wish to run it. Then check up the speed of the shaft from which the drive will take place and figure out the sprocket ratios so that you will not be getting too much current and overcharging the battery. For lights and horn only, a current of from 5 to 8 amperes would be sufficient.

If you are charging at the rate of 12 or 15 amperes and have no starting motor to use up some of the current, you will find that the battery is continually overcharged, and that there will be a tendency to burn out the generator and cause the lights to be unduly bright and the bulbs short lived. The generator should be driven on the car in the same direction that it runs as a motor when connected to a battery. One exception is a very old type Gray & Davis generator which was built with a boosting series field and a slipping clutch with friction type brake shoes in it.

### FLAT RATE

The fifth article in the Flat Rate series starts on page 19, and includes schedules covering operation on brakes.

## Carburetor on 1914 Packard Six



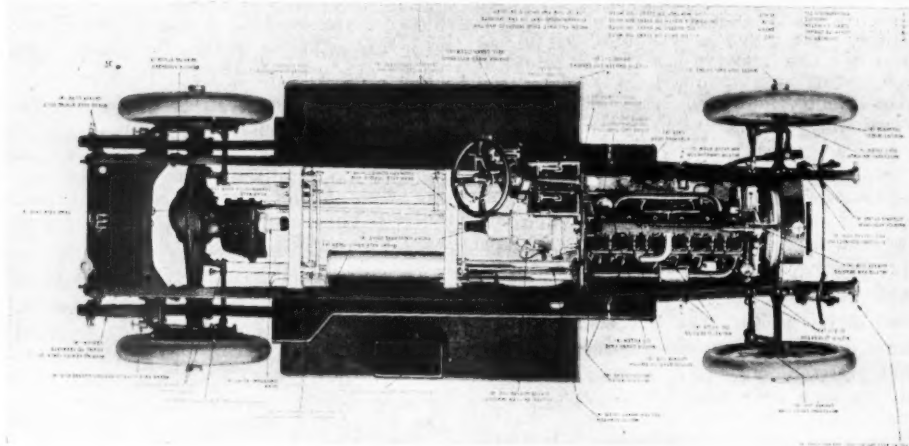
Q—Send me instructions and cross-sections to adjust a Packard 6, 1914, carburetor.

An illustration of the Packard carburetor is shown in Fig. 100296. We would also refer you to the clearing item

under this cut for information regarding the adjustments of the carburetor.

2—Send a greasing chart of this car.—A. D. Stuehm, Peotone, Ill.

2—Greasing chart requested is shown below.



## REMOVAL OF OIL DEPOSITS FROM STANLEY BOILER

Q—We have a Stanley steamer, 1920 model, 7-passenger touring, with a 20 h.p. fire tube boiler. Like everyone else who has used the condenser type of steam car, we have more or less oil trouble; that is, too much oil gets into the boiler from the water tank, and this is damaging. This annoyance was avoided when the car was exhausted to the air, as the oil did not get into the water tank as it does with the condenser system.

We wish you would, if you can do so, advise us where the Winslow boiler is made, if made at all at this time, or where we could get in touch with Mr. Doble who, at one time, had a pretty good working model of steam car. We would like to get a boiler made of some metal that is impervious to this oil and believe one can be built that will stand it. If you can give us any information on this subject we will certainly appreciate it.—Kopplin & Kopplin, Iron River, Wis.

Lubrication of some sort is needed in a steam engine and, as it is necessary

to condense the steam and use it over again to get greatest mileage from the water, it is unavoidable that some of the oil should get back into the boiler. The trouble, however, is not serious if the oil is removed before it has a chance to harden and form a scaly insulating surfact, which keeps water away from the metal and tends to cause the boiler to burn out.

If this condition has been going on for a long time in the boiler in the car you are working on it is possible that you may not be able to overcome it, but with a new boiler frequently cleaned there should be no trouble from this source.

We are sending you a complete set of instruction sheets in regard to cleaning the boiler of a Stanley steamer, the principle points in the cleaning process being as follows:

1—With upwards of 300 lbs. of steam on the boiler and the main burner and pilot shut off, open the surface blow-off valve until dry, blue steam appears.

2—Remove water tank plug and clean out tank by pouring kerosene or water (perfectly warm) through condenser; then replace plug and pour three gallons of clean kerosene into tank.

3—Pump this kerosene into boiler by running car on jacks with hand by-pass closed.

4—Open front and rear bottom blow-off valves; also close top shut-off valve and open blow-off valve on indicator. Leave them open until water is all out and kerosene begins to come; then close them.

5—Let car stand as long as convenient, to give kerosene time to loosen sediment, if any, on bottom of boiler.

6—Open surface blow-off valve and also the throttle and steam chest drain valves; fill boiler with water (preferably warm) until it runs out of the open valves.

7—The car is now ready for steaming up in the regular way.

We have no information on the Winslow boiler, but understand that Mr. Doble is in San Francisco and is making a Doble steam car. We do not believe that the trouble experienced could be overcome by making a boiler of some other metal, as no matter what the nature of the metal it would tend to heat up and burn out if allowed to become covered with a layer of scaly oil and sediment.

## LIGHTS MISBEHAVE ON THESE CARS WHEN RUN SLOWLY

Q—Advise why lights are dim, except with engine running very fast, on two Fords and one Briscoe. New Exide batteries are used and test o. k. Voltage and gravity being normal. Generators charge from 10 to 14 amperes and there are no loose connections in the circuit.—Pennsylvania Subscriber.

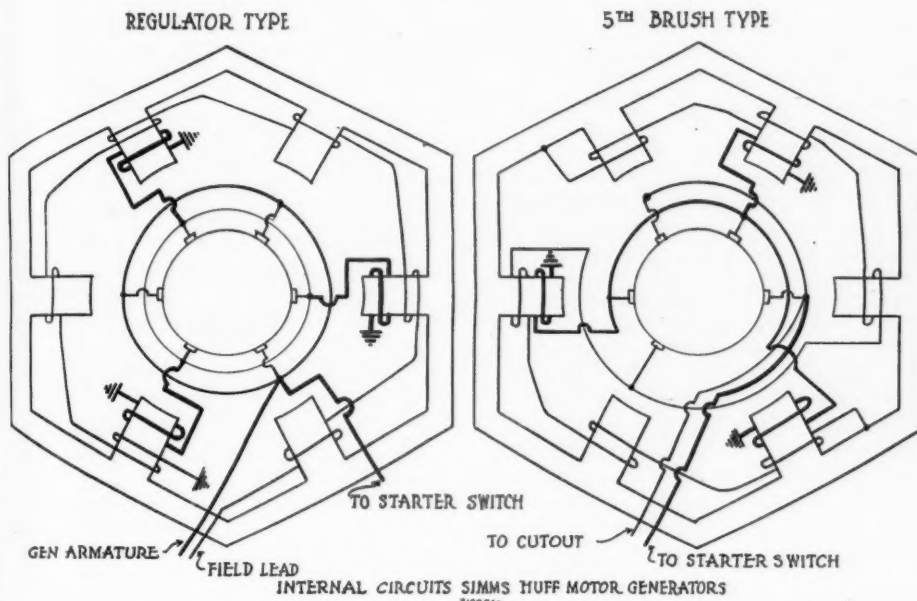
A connection does not have to be loose mechanically to be loose electrically; that is, to have a resistance which will waste or use up some of the voltage.

The only way to find such a condition is with a voltmeter and you should take voltage at the battery and also at the lamps with the lamps turned on. If the lamp voltage is about .2 volts less than the battery voltage it shows the condition of the wiring to be normal, but if the lamp voltage is very much less than the battery voltage it shows a loss due to poor connections.

You can then take other voltage readings, tracing along the circuit from lamps back to the battery until a sudden change in the voltage reading shows where the trouble is. If the voltage is nearly the same as the battery when a test is made at the lamps it shows the trouble to be in the lamps. The bulbs may be old or the bulbs may be out of focus or the reflectors may need resilvering. With a battery in good condition you will always get a brighter light with the generator charging than when it is not charging.



## Knowledge of Circuits Needed to Test Generator Right



Q—We have a Simms-Huff motor generator from a Maxwell car and we are having some trouble with it. We have tested the armature by the millivolt method and find very little difference testing all around the commutator. We have also tested the field winding and find that three of the field coils draw 8 amperes and the other three draw 5 amperes. All six field coils in series draw 1 ampere. We accordingly believe that the trouble is in the field winding. What do you think is the trouble with this machine?

1—We wonder if you have forgotten the part that the voltage regulator on the dash plays in the operation of this machine. The generator by itself cannot generate unless a connection is made which is normally made by the vibrating contacts of the regulator.

The 6 brush machine to which you refer was shown on page 43 of the March 1st, 1923, issue of MOTOR AGE, and at the bottom of this illustration two wires will be seen coming out of the machine, one being the generator armature wire or the wire from the insulated brushes while the other is the field lead. These two wires are normally connected together by the contacts in the regulator and when testing the generator only it is necessary to connect them together to make a plain shunt generator out of the machine.

To test the generator as a motor you will then connect one terminal of a battery to these two leads which have been connected together and connect the other battery terminal to the frame of the machine. It should then run as a motor using the generator circuit. If it runs steadily and at fairly low speed it is a fair indication that the generator is O. K., and if driven at a somewhat higher speed the discharge current taken from the battery should decrease to zero and then become a charging current as the speed is further increased on the test bench.

However, if the machine runs with a

decided jerk it shows the armature to be shorted or grounded.

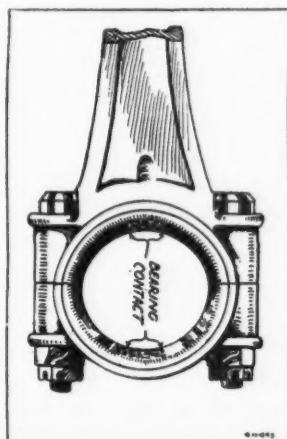
In this illustration you will notice that the shunt field winding is on all six poles but that the series winding for the operation as a starter is on three field poles only. This means that where the field poles have a series winding they do not have as much room for a shunt winding and we think this accounts for the variation in test, where in three cases you get an eight ampere draw and in other three cases 5 amperes. We accordingly believe that this does not show anything wrong with the field circuit.

2—We would like instructions for making a magnetizer to be used on a 6 or 12 volt battery.—Ide Garage, Outlook, Wash.

2—Instructions were given on page 46 of the May 31, 1923, issue of MOTOR AGE, copy of which is being sent to you.

### WILL A BAD BEARING SCORE THE CYLINDER?

Q—What kind of a knock would be produced in a connecting rod bearing that bears only on the places indicated in the drawing? There was quite an argument on this job. It was O. K'd by one mechanic and was turned down by another, who predicted a scored cylinder or a stuck piston. Now, who, in your



opinion, was justified in his argument and would this produce a noise similar to that of a piston that has been stuck? The crankpin was touching the bearing only at the top and bottom portions.—J. Baker, Springfield, O.

The fit of a bearing can have no effect on the piston or cylinder walls unless it is such as to pull the connecting rod sideways and cause the piston to exert undue pressure against one cylinder wall.

The fit that you describe, which is a 1/4-inch bearing running from one side of the rod to the other, however, would have no effect on the pistons or cylinders. Any tendency to score would be due to lack of oil or to the piston being too tight a fit.

The bad feature of a fit such as you describe is that the portion of the bearing which touches the crank pin has to carry the whole load. This means that the babbitt will rapidly wear away where it is touching the shaft so that the bearing soon becomes loose. An engine overhauled in this manner will appear to be all right at first and may be quite stiff. It will, however, loosen up very quickly and it will be found that it is no sooner loose than it starts to knock, due to loose bearings.

### CHEAPER TO EXCHANGE DRILL THAN BUILD IT OVER

Q—We have an electric drill of the direct current type with no name or marking of any kind on it. We want to know if this drill can be changed to alternating type, and what changes are necessary, also names of some companies that would do the job for us.—Motor Inn, Lewistown, Mont.

Direct current and alternating current motors are usually quite different. It sometimes happens that a motor will be made capable of operating on either current. In this case it is what is known as a series motor where the current first goes through the field winding and then through the armature, the same current flowing in each portion of the circuit.

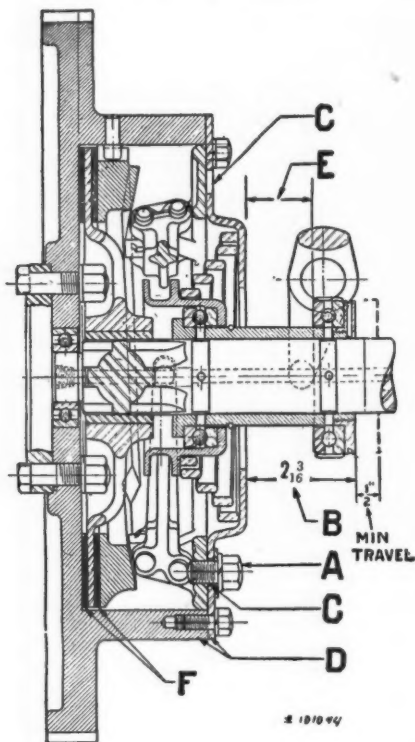
However, to take one individual motor and figure out the changes necessary is as much of a job as to redesign a motor which is to be built in quantities, so that we doubt if you could get any concern to handle the job for you at a reasonable figure. The engineering alone might be worth \$100.00, while the drill might be worth \$25.00.

We would accordingly suggest your getting in touch with concerns handling electric drills and buy one of the right type and then, through some concern dealing in second-hand tools, sell the one you have. We believe that this procedure would not only be the most satisfactory, but also least expensive in the long run.

### ON PAGE 24

of this issue are published the specifications of the 1923 Indianapolis racing cars.

## Adjustment of Borg and Beck Clutch



2—What makes a Borg & Beck clutch hold and not release when you have the clutch pedal pushed all the way down? We can wash out the clutch with gasoline and it will release for a while, but not long at a time. We have greased the throwout bearing and have taken it out and greased it all over and still it will not release.—Dewey Roberts, Hot Springs, Ark.

2—You doubtless have the clutch adjusted too tight and in the illustration you will notice a distance B, which should be  $2\frac{3}{16}$  inches. If the space here is any greater it will cause the trouble you experience.

The adjustment is accomplished by releasing the clutch with the foot lever and loosening both of the slot bolts A. For the condition experienced on your clutch you should then shift them counter-clockwise, or left-hand, about  $\frac{1}{2}$ -inch. Then let the clutch in and see if the opening at B is  $2\frac{3}{16}$  inches. Keep trying bolt A in different positions until you do get this distance correct. If bolts A come to the end of the slot so that no more movement is available they can be removed and placed in repeat holes so that additional adjustment can be obtained.

Q—We would like a little information on a  $3\frac{1}{2}$ -ton model W. D. Federal truck. It has a piece of aluminum in the shape of a gasket under each cylinder block, between the cylinder casting and the crankcase, and these aluminum pieces are from  $\frac{3}{16}$  to  $\frac{1}{4}$ -inch thick.

There are several other trucks around here which use the same engine; that is, Continental E4, among these being the Diamond T and the Armleder, and none of these have the aluminum spacing blocks between crankcase and cylinder block. What is the idea of using this

aluminum gasket and would it give more or less power to take it out?

1—The idea of a spacing block or gasket between the crankcase and cylinder block is doubtless to raise the blocks for the purpose of decreasing the compression in the combustion chamber.

In the last few years the change in the nature of the motor fuel or gasoline being used has caused engines with fairly high compression to knock as soon as a slight amount of carbon would accumulate in the combustion chamber. This has led manufacturers of motor cars and trucks to gradually reduce the compression in their engines. Removing the aluminum spacers between the crankcase and cylinder blocks would give you higher compression in the combustion chamber, but might cause the engine to knock as above indicated. However, if you can get Benzol or a fuel containing Benzol and use it continually you will be able to stand the high compression and will then get more power out of the engine.

If you are sure that the other engines which have no such aluminum spacers are of the same model then the reason for having the spacers in your engine is not quite so clear. They were probably put in by some mechanic, who was not himself clear as to the reason he was doing it.

### SIX VOLT BATTERY ON A DODGE

Q—Explain how the Brite-Lite controller or small plug that slips in back of the right Ford headlamp works? It is supposed to be used with lamps operating off the magneto. Have torn them apart and can find nothing different from the ordinary lamp plugs.

1—We have no information on this device, but if you care to advise us where it is sold or advertised, we will investigate further.

2—Will a 6-volt battery run a 12-volt ignition coil in a Dodge car satisfactorily? We have been told that a 6-volt battery can be used for lights temporarily, such as when having the other battery repaired.

Will the generator keep this battery charged as it should?—Illinois Subscriber.

2—The average ignition coil will give a fair spark when the voltage is adjusted to about half normal, but under some conditions it might make it difficult to start. However, in an emergency, if you use a 6-volt battery with a 12-volt ignition coil and find that the spark is weak you can probably get the engine to operate by removing the spark plugs and closing up the gap to .015 inches.

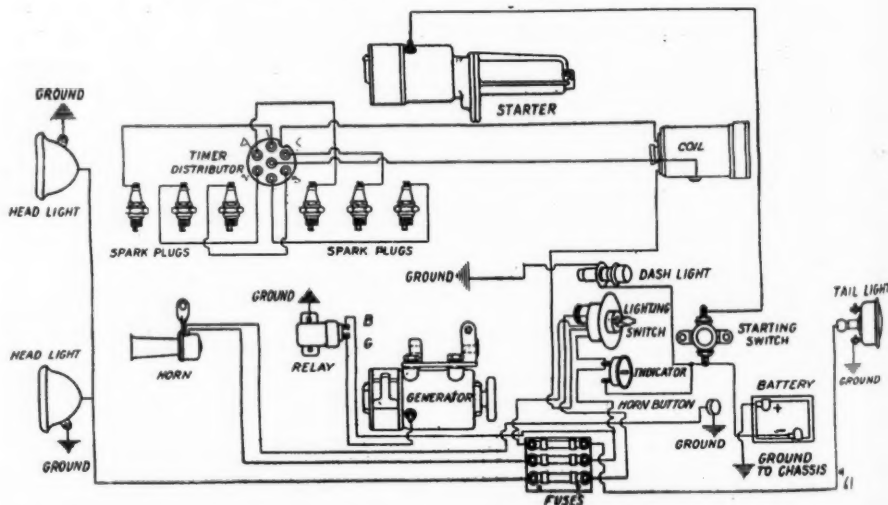
When it comes to the lamps they will, of course, be dim, operating on half voltage, and instead of showing a bright light, the filament will just glow dull red.

There is some question as to how the generator will operate. When the engine first starts up the generator will build its voltage up to 12 or a little over, at which time the cutout will close, connecting the 12-volt generator to the 6-volt battery. There will be a sudden rush of current, but the voltage of the battery will then lower the generator voltage and thereby weaken the shunt field of the generator.

The most likely chance of difficulty will be encountered in the cutout, for with only 6 volts thrown across the shunt winding there will be a tendency for it to let go and open the points even while the generator is charging the battery. The action of the charging current through the series winding tends to hold the points together and it is a question as to whether the effect will be strong enough to make up for the loss of magnetizing power shown by the shunt winding.

If trouble is encountered in the cutout it will show up on the ammeter by the needle flickering back and forth due to the points in the cutout opening and closing. However, if the engine is run at fairly high speed and not allowed to throttle down very much the charging current may be sufficient to hold the points closed.

## Wiring of 1917 Saxon-Six



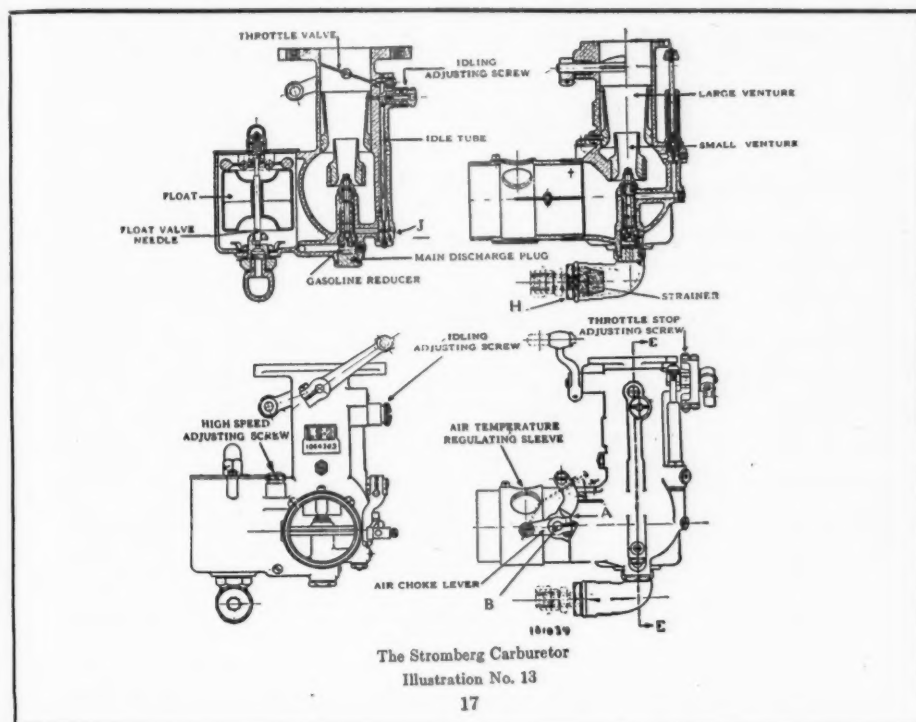
Q—Supply wiring diagram for a F. R. four, 1917 model Saxon 6.—Frank E.

Whedbee, Seabrook, Md.

Wiring diagram in question is shown.



## Stromberg Carburetor on Studebaker Special Six



Q—We are having trouble with a 1920 Special Six Studebaker touring car. This engine gallops at low throttle. We have ground the valves, cleaned carbon, taken up all bearings, reset timing according to specifications and have cleaned carburetor twice thoroughly, including high and low speed jets. This car throws no oil, fouls no plugs, pulls excellently and does not miss under any conditions.—R. F. Wilkinson, Hagerstown, Md.

The trouble is probably in the adjustment of the idling screw on the Stromberg carburetor used on this car. An illustration showing several views of this carburetor is given. The idling screw is at the upper portion of the carburetor on the side just under the flange which attaches the carburetor to the intake manifold. This screw varies the amount of air which mixes with the gasoline and which comes through a little opening above the throttle when the engine is

running at low speed. Turning the screw in, or to the right, or clockwise, cuts down the air, and turning to the left, or counter-clockwise, gives more air. From your description we feel that the mixture is too rich at low speeds and this screw needs to be turned to the left.

If there is no hot-spot on the manifold on this car it is also probable that you would get better operation if you installed one.

It might also be well to check up the compression in the different cylinders by turning the engine over by hand and also check the spark at low speeds to see that from the end of one of the high tension wires to the engine a spark will jump 3/16-inch without missing, when such a wire is removed from the spark-plug.

garagekeeper is negligent and causes the loss, he would be liable.

Still, if he has demanded the key and it has been refused, he might have a defense of contributory negligence on the part of the customer. But between them this is not a matter of insurance, although the garageman might have a policy for his own protection. Of course, if the garageman has a covering policy for his customers' cars, the customer would have an insurable interest in the policy and to recover he would have to conform to its terms, whatever they be.

However, under the customer's own policy, without a specific covering clause, failure to leave a key with the garageman in itself would be no defense for the insurance company. A car can be moved otherwise than by its rolling wheels. A practical side of this question is the fear of the customer to leave his key lest employees use the car at their pleasure, without consent.

We have no decision on this point and hence can only give an opinion on what a court would hold. The view is based on the points that the question of negligence does not enter in, and that the tendency of the courts is to construe the policy to cover rather than to restrict.

### WESTINGHOUSE AMMETER ON JEWETT NEEDS NO CONNECTIONS

Q—Give information regarding the way in which the ammeter is wired on the late model of Jewett cars. There is a red insulated wire leading from the battery and passing through a loop on the back of the ammeter but it is not connected to it in any way.

1—The new ammeter you speak of incorporates an old principle and because of this principle it is not necessary to actually connect the metallic part of the wire to any part of the ammeter. The loop on the back of this ammeter surrounds the wire and the current passing through creates a magnetic field in the loop which is directly connected to the ammeter mechanism. This field is created regardless of the fact that there is rubber insulation around the wire and in this respect it will not be necessary to make a direct metallic connection.

2—What is the proper tappet clearance for the new Paiges using 8-A. Continental engine?—J. J. Galles, Billings, Mont.

2—The recommended tappet clearance in the Paige 6-66 using the Continental engine mentioned is .004 of an inch when the engine is warm or .005 when the engine is cold.

### CHEMICAL ANALYSIS NOT ESSENTIAL FOR THE SERVICE MAN

Q—Furnish me with the physical and chemical properties as near as possible of the material of which Ford rear axle shafts are made.—E. L. Stevens, Phoenix, Arizona.

Information of such a technical nature is not available and we doubt very much whether any manufacturer cares to give out anything of the sort which so vitally concerns the satisfactory operation of their product. However, we understand that a good grade of alloy steel is used.

### LIABILITY OF GARAGE IN CASE OF FIRE WHEN OWNER HAS KEY

Q—Will you please advise whether it is true that a car owner who refuses to leave with a garagekeeper his key, so that the car can be moved, can recover from the insurance company in the event that the car is destroyed by fire while in the garage?—A Reader.

Insurance is a matter of contract. If the contract provides that the insured cannot collect insurance on his car destroyed by fire while in storage unless he leaves with the storage garageman the key to the car so that it can be moved, then if the insured fails to leave his key as provided and a loss is thereby had, he may not recover. He has breached a condition. But where there is no such condition in the policy he should be able to recover.

It is held that a casual or temporary change in the condition of insured property will not ordinarily be sufficient to avoid a policy under the "increase of

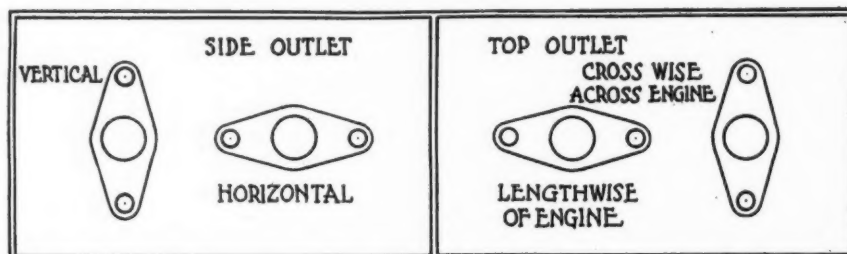
hazard" clauses in fire policies. This provision does not include "mere acts of negligence on the part of the insured, unless these are so continuous and of such a nature as to increase the hazard more or less permanently."

It would appear that in any event the failure to leave a key with the garagekeeper would be a matter of negligence contributing to a loss should a fire break out in the garage. It has been held that, in an action on a policy covering a car which was destroyed by fire, the fact that the owner was negligent was no defense for the company.

If the garageman has a fire policy covering his garage and contents, then whether he might recover under his policy depends on its terms. Whether the customer may recover from the garageman is another matter. This is not a matter of insurance between the parties, but a matter of negligence. If the ga-

# Carburetor Equipment on 1922 Gasoline Motor Trucks

Motor Age Maintenance Data Sheet No. 201



MAKE	Model	Tons Capacity	ENGINE		CARBURETOR						Hot Air Flexible Tube	
			Make	Model	Make	Model	Nominal Size (Ins)	Type of Connection Outlet	Type of Flange	Air Pre-heated	Outside Diameter	Length
Ace.		1 1/2	Buda	WU	Zenith		1	Top	Crosswise	Yes	1 1/2	24
Ace.		2 1/2	Buda	ETU	Zenith		1 1/4	Top				
Acme.	G	3/4	Continental	N	Rayfield	M2	1	Top	Crosswise	Yes	1 1/2	24
Acme.	B	1	Continental	N	Rayfield	LL2P	1	Top	Crosswise	Yes	1 1/2	27
Acme.	F	1 1/2	Continental	J4	Zenith	O4	1	Top	Crosswise	Yes	1 1/2	11
Acme.	A	2-2 1/2	Continental	C4	Rayfield	GL-3P	1 1/4	Top	Crosswise	Yes	1 1/2	10
Acme.	AC	2 1/2	Continental	L4	Zenith	L5	1 1/4	Top	Crosswise	Yes	1 1/2	15
Acme.	C	3 1/2	Continental	L4	Zenith	L5	1 1/4	Top	Crosswise	Yes	1 1/2	14
Acme.	E	5	Continental	B2	Rayfield	G4	1 1/2	Top	Crosswise	Yes	1 1/2	16
Akron.	20	1 1/4	Hinkley	HAA400	Stromberg	M2	1 1/4	Top	Crosswise	Yes	1 1/2	9 1/4
American.	25	2 1/2	Wisconsin	TAU	Stromberg	M2	1 1/4	Side				
American.	40	4	Wisconsin	VAU	Stromberg	M2	1 1/4	Side		Yes		
Armleder.	30	1 1/2	Buda	CTU	Zenith	L4	1 1/4	Side		Yes		
Armleder.	HW	2 1/2	Continental	C4	Zenith	L5	1 1/4	Side				
Armleder.	KW	3 1/2	Buda	YTU	Zenith	L5	1 1/4	Side		Yes		
Atterbury.	20R	1 1/2	Continental	L4	Zenith	U4C	1	Side	Horizontal	Yes	1 1/2	10 1/2
Atterbury.	7CX	2 1/2	Continental	C4	Zenith	U5C	1 1/4	Side	Vertical	Yes	1 1/2	12 1/4
Atterbury.	7DX	3 1/2	Continental	E4	Zenith	Q5C	1 1/4	Side	Vertical		1 1/2	16 1/4
Atterbury.	8E	5	Continental	B2	Zenith	L6	1 1/2	Side	Horizontal	No	1 1/2	18
Atterbury.	8E	3 1/2-4 1/2	Continental	T8000	Tale & Towne	HP4-B	1 1/4	Side	Horizontal	Yes	1 1/2	20 1/2
Autocar.	21F	1 1/2-2	Own		Stromberg	M2	1 1/4	Top	Lengthwise	Yes		
Autocar.	27K	2	Own		Stromberg	M2	1 1/4	Top	Lengthwise	Yes	1 1/2	30
Autocar.	26B	5	Own		Stromberg	M2	1 1/4	Top	Lengthwise	Yes	1 1/2	9
Available.	H	1 1/2	Hercules	CU3	Stromberg	M1	1	Top	Lengthwise	No	1 1/2	30
Available.	H	2 1/2	Hercules	CU3	Stromberg	M1	1	Top	Lengthwise	No	1 1/2	30
Available.	H	3 1/2	Hercules	MU3	Stromberg	M2	1 1/4	Top	Lengthwise	No	1 1/2	30
Available.	H	5	Hercules	T3	Stromberg	M3	1 1/2	Top	Crosswise	No	2	30
Belmont.	D	2	Buda	ETU	Zenith	L5	1 1/4	Side	Horizontal	No	1 1/2	14
Bessemer.	G	1	Continental	N	Stromberg	M1	1	Top	Lengthwise	No		
Bessemer.	H2	1 1/2	Continental	N	Stromberg	M1	1	Top	Lengthwise	No	1 1/2	32
Bessemer.	J2	2 1/2	Continental	C	Stromberg	M2	1 1/4	Top	Lengthwise	No	1 1/2	12
Bessemer.	K2	4	Continental	E7	Stromberg	M2	1 1/4	Top	Lengthwise	No		
Chevrolet.	G	3/4	Own		Zenith	T4	1	Top	Lengthwise		1 1/2	
Chicago.	C	3 1/2	Hercules	CU3	Stromberg		1 1/4	Top	Lengthwise	Yes		
Chicago.	D	5	Hercules	MU3	Stromberg		1 1/4	Top	Lengthwise			
Clydesdale.	10	3/4	Continental	N	Zenith	34	1	Top	Lengthwise	No	1 1/2	18
Clydesdale.	20	1	Continental	N	Zenith	O4	1	Top	Lengthwise	No	1 1/2	30
Clydesdale.	65EX	2 1/2	Continental	E4	Zenith	L6	1 1/2	Top	Lengthwise	No		
Clydesdale.	90	3 1/2	Continental	E4	Zenith	L6	1 1/2	Top	Lengthwise	Yes		
Clydesdale.	120B	5	Continental	B2	Stromberg		1 1/2	Top	Lengthwise			
Collier.	23	3/4-1 1/2	Continental	N	Zenith	O3	1	Side	Vertical	No	1 1/2	20
Collier.	19	1 1/2	Continental	N	Zenith	24C	1	Top	Horizontal	No	1 1/2	25
Collier.	21	2	Continental	C4	Zenith	O5	1 1/4	Top	Lengthwise	No	1 1/2	16
Commerce.	T	3/4	Continental	N	Zenith	S4	1	Top				
Commerce.	16	2	Continental	N	Zenith	S4	1	Top				
Commerce.	18	2 1/2	Continental	CL	Zenith	S5	1 1/4	Top				
Corbitt.	H-22	1	Continental	N	Stromberg	M1	1	Side		Yes		
Corbitt.	C-22	2	Continental	C4	Stromberg	M2	1 1/4	Top		Yes		
Corbitt.	R	3	Continental	E4	Stromberg	M2	1 1/4	Top		Yes		
Corbitt.	AA-22	5	Continental	B2	Stromberg	M3	1 1/2	Top		Yes		
Day-Elder.	A	1	Continental	N	Zenith	O5	1 1/2	Top	Lengthwise	Yes	1 1/2	22
Day-Elder.	D	2-2 1/2	Continental	C2	Zenith	QC5	1 1/4	Top	Lengthwise	Yes	1 1/2	12 1/2
Day-Elder.	F	3 1/2-4	Continental	E4	Zenith	Q6C	1 1/2	Top	Lengthwise	Yes	2	5
Day-Elder.	E	5-6	Buda	YU	Zenith	Q6C	1 1/2	Top	Lengthwise	Yes	2	27
Dearborn.	48	2	Buda	WU	Stromberg	M1	1	Top		No		
Dearborn.	E	1	Buda	MU	Stromberg	M1	1	Top		No		
Defiance.	G	1	Highway	AA	Stromberg	M1	1	Top	Crosswise	No		
Defiance.	E	2	Highway	AA	Stromberg	M1	1	Top	Crosswise	No		
Denby.	31	3/4	Continental	N	Stromberg	M1	1	Top	Lengthwise	Yes	1 1/2	25
Denby.	134	2	Continental	N	Stromberg	M1	1	Top	Lengthwise	Yes	1 1/2	25
Denby.	25	3	Continental	C2	Stromberg	M2	1 1/4	Top	Lengthwise	Yes	1 1/2	25
Denby.	27	4	Continental	E7	Stromberg	M2	1 1/4	Top	Lengthwise	Yes		
Denby.	210	5	Continental	E7	Stromberg	M2	1 1/4	Top	Lengthwise	Yes		
Dependable.	C	1 1/2	Buda	CTU	Zenith		1	Top	Lengthwise	Yes	1 1/2	6
Dependable.	E	2 1/2	Buda	HTU	Zenith		1 1/4	Top	Lengthwise	Yes	1 1/2	14
Diamond T.	O3	1-1 1/4	Hinkley	HA300	Stromberg	M1	1	Top		Yes		
Diamond T.	K	3 1/2	Hinkley	HA500	Stromberg	M1	1 1/4	Top		Yes		
Diamond T.	EL	5	Hinkley	HA200	Stromberg	M1	1 1/4	Top				
Dodge Brothers.		1 1/2	Own		Stewart	Special	1	Top	Lengthwise			
Dorris.	K-4	2 1/2	Own		Stromberg	M2	1 1/4	Top	Crosswise	No		
Dorris.	K-7	3 1/2	Own		Stromberg	M2	1 1/4	Top	Crosswise	No		
Dort.	103	1 1/2	Lycorning	K	Carter		1	Side	Horizontal	No		



MAKE	Model	Tons Capacity	ENGINE		CARBURETOR						Hot Air Flexible Tube	
			Make	Model	Make	Model	Nominal Size (Ins.)	Type of Connection Outlet	Type of Flange	Air Pre-heated	Outside Diameter	Length
Duplex.....	A	1½-2	Hinkley	HAA	Stromberg	.....	1¼	Top	.....	.....	.....	.....
Duplex.....	E	3½	Buda	ETU	Schebler	.....	1¼	Top	.....	.....	.....	.....
Fagol.....	.....	1½-2	Waukesha	BUX	Zenith	L4	1	Top	Lengthwise	.....	.....	.....
Fagol.....	.....	2½-3	Waukesha	RU4X	Zenith	L5	1¼	Top	.....	.....	.....	.....
Federal.....	TE	1½-2	Continental	C4	Zenith	OP5	1¼	Top	.....	Yes	.....	.....
Federal.....	UE	2-2½	Continental	C4	Zenith	OP5	1¼	Top	.....	Yes	.....	.....
Federal.....	WE	3½-4	Continental	E4	Zenith	OP5S	1¼	Top	.....	Yes	.....	.....
Federal.....	X2	5-6	Continental	B2	Zenith	L6	1¼	Top	.....	Yes	1¼*	6¾*
Ford.....	T	1	Own	.....	Own	.....	1	Side	Horizontal	No	2	30
F. W. D.....	B	3	Wisconsin	A	Stromberg	M3	1¼	Top	Lengthwise	.....	.....	.....
G. M. C.....	K16	1	Own	.....	Marvel	.....	1¼	Top	Lengthwise	.....	.....	.....
G. M. C.....	K41A&B	2	Own	.....	Marvel	.....	1¼	Top	Lengthwise	.....	.....	.....
G. M. C.....	K71	3½	Own	.....	Marvel	.....	1¼	Top	Lengthwise	.....	.....	.....
G. M. C.....	K101	5	Own	.....	Marvel	.....	1¼	Top	Lengthwise	.....	.....	.....
Graham Bros.....	.....	1	Dodge	.....	Stewart	Special	1	Top	.....	.....	.....	.....
Gary.....	I	1½	Buda	IU	Master	.....	1¼	Top	.....	.....	.....	.....
Gary.....	K	3½	Buda	YTU	Master	.....	1¼	Top	.....	.....	.....	.....
Gary.....	M	5	Buda	ETU	Master	.....	1¼	Top	.....	.....	.....	.....
Garsix.....	K	2½	Buda	HTU	Stromberg	M2	1¼	Top	.....	.....	.....	.....
Gramm-Pioneer.....	10	1	Lycoming	KB	Stromberg	M1	1	Side	.....	.....	.....	.....
Gramm-Pioneer.....	15	1½	Continental	N	Stromberg	MB1	1	Top	.....	.....	1¼	8
Harvey.....	WOA	2	Buda	OU	Stromberg	M2	1¼	Top	Crosswise	.....	1½	24
Harvey.....	WFA	2½	Buda	HU	Stromberg	M2	1¼	Top	Crosswise	.....	2	-26
Harvey.....	WHA	3½	Buda	YU	Stromberg	M3	1½	Top	Crosswise	.....	.....	.....
Indiana.....	12	1½	Waukesha	BUX	Stromberg	.....	1	Top	.....	.....	.....	.....
Indiana.....	25	2½	Own	.....	Stromberg	M2	1¼	Top	.....	.....	.....	.....
Indiana.....	51	5	Waukesha	EAX	Stromberg	M2	1¼	Side	Vertical	.....	.....	.....
International.....	S	¾	Lycoming	KB	Ensign	D	1¼	Side	Vertical	.....	.....	.....
International.....	21	1	Own	.....	Ensign	B	1¼	Side	Vertical	.....	.....	.....
International.....	61	3	Own	.....	Ensign	D	1¼	Side	Vertical	.....	.....	.....
International.....	101	5	Own	.....	Ensign	MD	1	Side	Vertical	.....	1¼	36
Kalamazoo.....	G1	1½	Continental	N	Stromberg	M1	1¼	Top	Crosswise	.....	1¼	18
Kalamazoo.....	G2	1½	Continental	J4	Stromberg	M1	1¼	Top	Crosswise	.....	1¼	32
Kalamazoo.....	H	2½	Wisconsin	TAU	Stromberg	M1	1¼	Top	Crosswise	.....	1¼	32
Kalamazoo.....	K	3½	Wisconsin	UAU	Stromberg	M2	1¼	Top	Crosswise	.....	1¼	32
Kalamazoo.....	K5	5	Wisconsin	VAU	Stromberg	M2	1¼	Top	Crosswise	.....	1¼	17¼
Kearns.....	N	2	Herschell-S.	7000	Zenith	.....	.....	Side	Horizontal	.....	1¼	.....
Kelly-Spring.....	34	1½	Own	.....	Zenith	L4	1	.....	.....	.....	.....	.....
Kelly-Spring.....	K41	1½	Own	.....	Zenith	.....	.....	.....	.....	.....	.....	.....
Keystone.....	.....	2	Buda	WV	Zenith	L4	1	Side	.....	.....	1¼	8¾
Kimball.....	AC	2	Wisconsin	UAU	Master	.....	1¼	Top	Crosswise	.....	1¼	8¾
Kimball.....	AE	4	Wisconsin	RAU	Zenith	.....	1¼	Top	Crosswise	.....	1¼	27½
Kissel.....	.....	1½	Own	.....	Stromberg	MB2	1¼	Top	Vertical	.....	1¼	27½
Kissel.....	.....	2½	Own	.....	Stromberg	MB2	1¼	Top	Vertical	.....	1¼	27½
Kissel.....	.....	3½	Own	.....	Stromberg	MB2	1¼	Top	Vertical	.....	1¼	27½
Kleiber.....	.....	1	Continental	K4	Stromberg	M2	1¼	Top	.....	.....	.....	.....
Kleiber.....	.....	2	Continental	K4	Stromberg	M2	1¼	Top	.....	.....	.....	.....
Kleiber.....	.....	3½	Continental	L4	Stromberg	M2	1¼	Top	.....	.....	.....	.....
Kleiber.....	.....	5	Buda	BTU	Stromberg	M3	1½	Top	.....	.....	1¼	14
Larrabee.....	X2	1	Continental	7R	Zenith	O4	1	Top	Lengthwise	.....	1¼	9
Larrabee.....	K4	1½	Continental	J4	Zenith	O4	1	Top	Lengthwise	.....	1¼	12
Larrabee.....	L4	3½	Continental	L4	Zenith	O5	1¼	Top	Lengthwise	.....	.....	.....
Maccar.....	HA	2	Continental	K4	Zenith	SG5	1¼	Top	.....	.....	.....	.....
Maccar.....	H2	3	Continental	L4	Zenith	SG5	1¼	Top	.....	.....	.....	.....
Maccar.....	G	5	Continental	B2	Zenith	ST6	1¼	Top	.....	.....	.....	.....
MacDonald.....	A	7½	Buda	YTU	Stromberg	M	1¼	Top	.....	.....	1¼	20
Mac.....	AB	1½	Own	.....	Schebler	R	1¼	Top	Lengthwise	.....	1¼	20
Mac.....	AB	2	Own	.....	Schebler	R	1¼	Top	Lengthwise	.....	1¼	8
Mac.....	AC	3½	Own	.....	Schebler	R	1¼	Top	Lengthwise	.....	1¼	20
Mac.....	AB	5	Own	.....	Schebler	R	1¼	Top	Lengthwise	.....	1¼	8
Mac.....	AC	5	Own	.....	Schebler	R	1¼	Top	Lengthwise	.....	1¼	8
Mac.....	AC	7½	Own	.....	Schebler	R	1¼	Top	Lengthwise	.....	1¼	.....
Master.....	JW	1½	Buda	DU	Master	.....	1¼	Top	.....	.....	.....	.....
Master.....	W	2½	Buda	HU	Master	.....	1¼	Top	.....	.....	.....	.....
Master.....	B	5	Buda	ATU	Master	.....	1¼	Top	.....	.....	.....	.....
Menominee.....	H	1½	Wisconsin	EAU	Stromberg	M1	1	Top	Lengthwise	.....	1¼	24
Menominee.....	D	2	Wisconsin	TAU	Stromberg	M2	1¼	Top	Lengthwise	.....	.....	.....
Menominee.....	J	3½	Wisconsin	VAU	Stromberg	M2	1¼	Top	Lengthwise	.....	.....	.....
Noble.....	B30	1½	Buda	CTU	Stromberg	M1	1	Top	Crosswise	.....	1¼	11
Noble.....	C40	2	Buda	ITU	Stromberg	M2	1¼	Top	Crosswise	.....	1¼	14
Noble.....	D50	2½	Buda	HTU	Stromberg	M2	1¼	Top	Crosswise	.....	1¼	12½
Noble.....	E70	3½	Buda	YTU	Stromberg	M2	1¼	Top	Crosswise	.....	1¼	13
Norwalk.....	25E	1	Lycoming	K	Zenith	O4	1	Top	Vertical	.....	1¼	7
Norwalk.....	35	2	Buda	CTU	Zenith	O4	1	Top	Horizontal	.....	1¼	8½
Old Reliable.....	A	1½	Wisconsin	EAU	Stromberg	M2	1¼	Top	.....	.....	.....	.....
Old Reliable.....	C	3½	Wisconsin	UAU	Stromberg	M2	1¼	Top	.....	.....	.....	.....
Old Reliable.....	D	5	Wisconsin	RAU	Stromberg	M3	1½	Top	.....	.....	.....	.....
Oneida.....	B9	1½	Hinkley	400	Stromberg	M1	1	.....	.....	.....	.....	.....
Oneida.....	D9	3½	Hinkley	200	Stromberg	M2	1¼	.....	.....	.....	1¼	28
Packard.....	EX	2	Own	.....	Own	.....	1¼	Side	Horizontal	.....	1¼	28
Packard.....	ED	3	Own	.....	Own	.....	1¼	Side	Horizontal	.....	1¼	28
Packard.....	EF	5	Own	.....	Own	.....	1¼	Side	Horizontal	.....	1¼	9
Paige.....	52	1½	Hinkley	HA400	Stromberg	M2	1¼	Top	Lengthwise	.....	1¼	10¾
Paige.....	54	2½	Hinkley	HA500	Stromberg	M2	1¼	Top	Lengthwise	.....	1¼	10¾
Paige.....	51	3½	Hinkley	HA200	Stromberg	M2	1¼	Top	Lengthwise	.....	1¼	16½
Parker.....	G1	2½	Wisconsin	VAU	Stromberg	M2	1¼	Top	Lengthwise	.....	1¼	16½
Parker.....	J20	3½	Wisconsin	VAU	Stromberg	M2	1¼	Top	Lengthwise	.....	1¼	18½
Parker.....	M20	5	Wisconsin	RBU	Stromberg	M3	1¼	Top	Lengthwise	.....	1¼	25
Patriot.....	Revere	1	Continental	N	Stromberg	MB1	1¼	Side	Horizontal	.....	1¼	10
Patriot.....	Lincoln	2	Hinkley	HA400	Stromberg	M1	1	Top	Crosswise	.....	.....	.....
Pierce Arrow.....	X5	2	Own	.....	Stromberg	M2	1¼	Top	Crosswise	.....	.....	.....
Pierce Arrow.....	W2	3½	Own	.....	Stromberg	M3	1¼	Top	Crosswise	.....	.....	.....
Pierce Arrow.....	R2	5	Own	.....	Stromberg	M3	1¼	Top	Crosswise	.....	.....	.....
Pittsburgher.....	C21	3	Midwest	202	Stromberg	M2	1¼	Top	Crosswise	.....	2¼	14
Rainier.....	R21	¾	Continental	N	Zenith	Q4C	1	Top	Lengthwise	.....	1¼	24
Rainier.....	R19	1	Continental	N	Zenith	Q4C	1	Top	Lengthwise	.....	.....	.....
Rainier.....	R18	2	Continental	C2	Zenith	O5	1¼	Top	Lengthwise	.....	.....	.....
Rainier.....	R15	3½	Continental	L4	Zenith	O5	1¼	Top	Lengthwise	.....	.....	.....
Rainier.....	R17	5	Continental	B2	Zenith	L6	1½	Top	Lengthwise	.....	.....	.....
Reo.....	F	1	Own	.....	Johnson	A	1	Top	Lengthwise	.....	1¼	14¼
Republic.....	75	¾	Lycoming	KB	Stromberg	M1	1	Top	Lengthwise	.....	1¼	12
Republic.....	10	1	Continental	N4	Stromberg	.....	1¼	Top	Lengthwise	.....	1¼	42
Republic.....	19	2½	Continental	C2	Stromberg	.....	1¼	Top	Lengthwise	.....	.....	.....
Republic.....	20	3½	Continental	E4	Stromberg	.....	1¼	Top	Lengthwise	.....	.....	.....

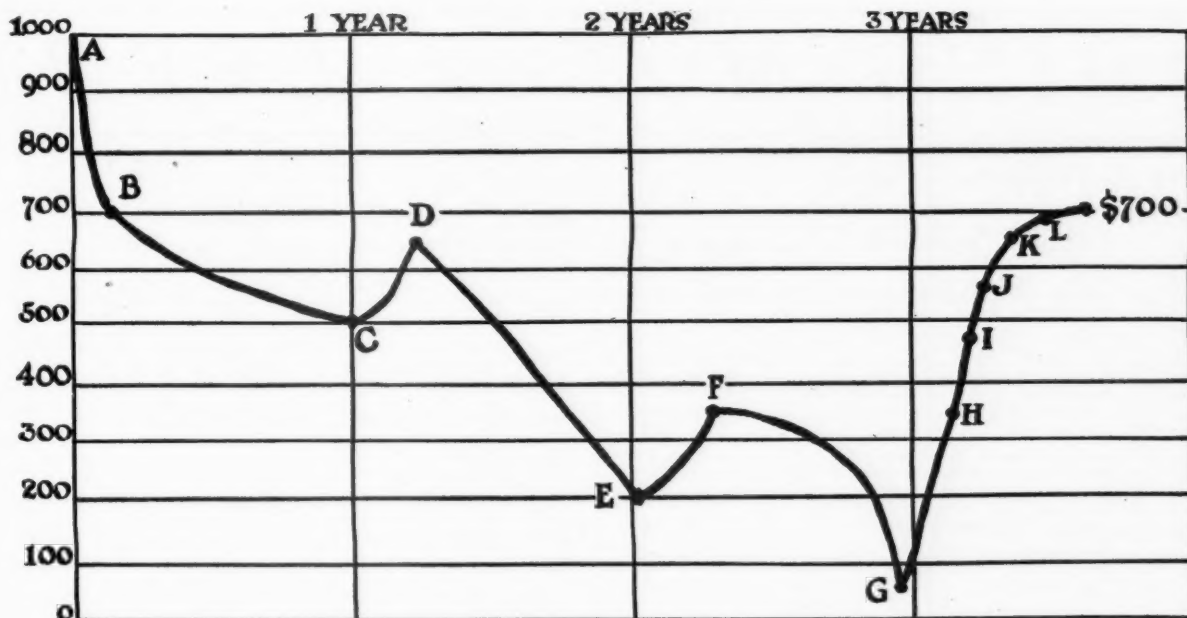
\*—Nonflexible.

†—Inside Diameter.

MAKE	Model	Tons Capacity	ENGINE		CARBURETOR						Hot Air Flexible Tube	
			Make	Model	Make	Model	Nominal Size (Ins.)	Type of Connection Outlet	Type of Flange	Air Pre-heated	Outside Diameter	Length
Rowe	CW	1½	Wisconsin	CAU	Zenith	O5	1¼	Top				
Rowe	GSW	3	Wisconsin	TAU	Zenith	O5	1¼	Top				
Rowe	FW	5	Wisconsin	VAU	Zenith	O5	1¼	Top				
Ruggles	20AR	1¼	Own		Stromberg	M2	1¼					
Ruggles	40	2	Own		Stromberg	M2	1¼					
Ruggles	40H	3	Own		Stromberg	M2	1¼					
Rumely	A	1½	Buda	CTU	Stromberg	M1	1	Top	Lengthwise		1½	23
Ramsen	25	1¼	Own		Zenith	Q4C	1	Top	Lengthwise		1½	31
Sandow	G	1	Continental	N	Stromberg			Side				
Sandow	J	2½	Continental	C4	Stromberg		1¼	Side				
Sanford	15	¾	Own		Zenith	Q4C	1	Top	Lengthwise		1½	31
Sanford	W125	2½	Continental	C4	Stromberg		2	Top	Crosswise		1½	15
Sanford	W135	3½	Continental	E4	Stromberg		2	Top	Crosswise		1½	15
Sanford	W150	5	Continental	E4	Stromberg		2	Top	Crosswise		1½	15
Schacht	F	2	Buda	ETU	Schebler	A	1¼	Top	Lengthwise		2	14
Schacht	F	3	Buda	ETU	Schebler	A	1¼	Top	Lengthwise		2	14
Schacht	E	4	Buda	YTU	Schebler	A	1¼	Top	Lengthwise		2	13
Schacht	E	5	Buda	YTU	Schebler	A	1¼	Top	Lengthwise			
Schwartz	A	1¼	Lycoming	KB	Carter		1	Side	Horizontal			
Schwartz	B2W	2	Buda	CTU	Stromberg	M1	1	Top	Lengthwise			
Schwartz	C2W	3	Buda	HTU	Stromberg	M2	1¼	Top	Lengthwise			
Schwartz	DW	5	Buda	YTU	Stromberg	M2	1¼	Top	Lengthwise			
Selden	A	1½	Continental	N	Stromberg		1	Top	Crosswise			
Selden	A	2½	Continental	C4	Stromberg		1¼	Top	Crosswise			
Selden	A	3½	Continental	E7	Stromberg		1¼	Top	Crosswise			
Selden	A	5	Continental	B2	Stromberg		1½	Top	Crosswise			
Service	15	¾-1	Midwest	408	Stromberg		1¼	Top	Lengthwise		1½	8½
Service	31	1½	Buda	IU	Stromberg	M2	1¼	Top	Lengthwise		1½	8½
Service	36	1½-2	Buda	HU	Stromberg	M2	1¼	Top	Lengthwise		1½	8½
Service	51	2½-3	Buda	HU	Stromberg	M2	1¼	Top	Lengthwise		1½	8½
Service	101	5	Buda	YU	Stromberg	M2	1¼	Top	Lengthwise		1½	8½
Signal	NF	1	Continental	J4	Stromberg	M1		Top				
Signal	H	1½	Continental	C4	Stromberg	M2		Top				
Signal	M	3½	Continental	E4	Stromberg			Top				
Signal	R	5	Continental	B2	Stromberg			Top				
Standard	IK	1¼	Continental	D	Stromberg	M1	1	Top	Crosswise			
Standard	76	2¼	Continental	C2	Stromberg	M2	1¼	Top	Crosswise			
Standard	66	3¼	Continental	E7	Stromberg	M2	1¼	Top	Crosswise			
Standard	5K	5	Continental	B2	Stromberg	M3	1½	Top	Vertical			
Sterling		1¼	Waukesha	FU	Zenith	L5	1¼	Top	Crosswise		1½	6½
Sterling		2	Waukesha	FU	Zenith	L5	1¼	Top	Crosswise		1½	6½
Sterling		3¼	Waukesha	DU	Zenith	L6	1½	Top	Crosswise		1½	8
Sterling		5	Waukesha	EU	Zenith	L6	1½	Top	Crosswise		1½	8
Sterling		7½	Waukesha	EU	Zenith	L6	1½	Top	Crosswise		1½	8
Stoughton	A	1	Waukesha	BUX	Stromberg	M	1	Top				
Stoughton	D	2	Hercules	CU3	Stromberg	M	1¼	Top				
Stoughton	F	3	Hercules	MU2	Stromberg	M2	1¼	Top				
Sullivan	E	2	Buda	HTU	Stromberg	M2	1¼	Top	Lengthwise		1½	12½
Sullivan	H	3¼	Buda	YTU	Stromberg	M2	1¼	Top	Lengthwise		1½	14
Super Truck	70	3¼	Wisconsin	UAU	Zenith	L5	1¼	Side				
Super Truck	50	2¼	Wisconsin	TAU	Zenith	L5	1¼	Side				
Tiffin	GW	1¼	Continental	C4	Schebler	R	1¼	Top	Lengthwise		1	20
Tiffin	MW	2¼	Continental	C4	Schebler	R	1¼	Top	Lengthwise		1	20
Tiffin	F35	3¼	Continental	L4	Stromberg	M	1¼	Top	Crosswise		1½	20
Tiffin	TW	5	Continental	B2	Schebler	R	1¼	Top	Lengthwise		1	22
Tiffin	UW	6	Continental	B2	Schebler	R	1¼	Top	Lengthwise		1	22
Titan		2½	Buda	HTU								
Titan		5-6	Buda	YTU	Stromberg	M	1¼					
Traffic		1¼	Continental	N	Carter	L	1	Side				
Transport	20	1	Buda	WU	Stromberg	M1	1	Top	Lengthwise		1½	19
Transport	30	1¼	Continental	N	Stromberg	M1	1	Top	Lengthwise		1½	22
Transport	50	2¼	Buda	HTU	Stromberg	M2	1¼	Top	Lengthwise		1½	18
Transport	70	3¼	Buda	YTU	Stromberg	M		Top	Lengthwise		1½	12
Traylor	B	1½	Buda	WU	Zenith		1	Top				
Traylor	C	2	Buda	ITU	Zenith		1¼	Top				
Traylor	D	3	Buda	HTU	Zenith		1¼	Top				
Traylor	F	5	Buda	YTU	Zenith		1¼	Top				
Triangle	AA	1	Herschell-S.	7000	Stromberg	MB1	1	Side	Horizontal		1½	20
Triangle	B	2¼	Waukesha	FU	Stromberg	M2	1¼	Top	Lengthwise		1½	12
Ultimate	A	2	Buda	HTU	Stromberg	M	1¼	Top	Crosswise		1-¾	14
Ultimate	B	3	Buda	HTU	Stromberg	M	1¼	Top	Crosswise		1-¾	14
Union	FW	2¼	Wisconsin	TAU	Schebler	R	1¼	Top				
Union	HW	4	Wisconsin	VAU	Schebler	R	1¼	Top				
United	AT	1¼	Buda	CTU	Stromberg	M1	1	Top				
United	BT	2¼	Buda	ETU	Stromberg	M2	1¼	Top				
United	CT	3¼	Buda	ETU	Stromberg	M2	1¼	Top				
United States	N	1¼	Continental	N	Stromberg	MB1	1	Side	Vertical		1½	20
United States	R	3	Hinkley	HA400	Stromberg	M2	1¼	Top	Horizontal		1½	11
United States	S	4	Hinkley	HA200	Stromberg	M2	1¼	Top	Lengthwise		1½	11
United States	T	6	Buda	ATU	Stromberg	M3	1½	Top				
Vellie	46	1½	Continental	N	Stromberg	M	1	Top	Lengthwise			
Vim	50	¾	Hercules	O	Zenith	4TX	1	Top	Lengthwise		1½	15
Vulcan	25	2¼	Wisconsin	UAU	Zenith		1¼	Top	Lengthwise		2½	38
Walker-Johnson	A	2	Buda	WU	Zenith		1	Top	Lengthwise		1	21½
Walker-Johnson	B	3	Buda	HU	Zenith	L5	1¼	Top	Lengthwise		1½	21½
Walter	S	5	Waukesha	DU	Stromberg	M	1½	Top	Lengthwise		2	10
White	15	¾	Own		Own		1¼	Top				
White	20	2	Own		Own		1¼	Top				
White	40	3½	Own		Own		1½	Top				
White	45	5	Own		Own		1½	Top				
Wichita	L	1¼	Waukesha	BX	Stromberg	M	1¼	Top	Lengthwise		1½	20
Wichita	R	2½	Waukesha	BX	Stromberg	M	1¼	Top	Lengthwise		1½	20
Wichita	S	5	Waukesha	DU	Stromberg	M	1¼	Top	Lengthwise		1½	24
Wilcox	AA	1	Buda	CTU	Stromberg	M1	1	Top	Lengthwise		1½	13½
Wilcox	E	3¼	Buda	YTU	Stromberg	M	1¼	Top	Lengthwise		1½	13½
Wilcox	F	5	Buda	ATU	Stromberg	M	1¼	Top	Lengthwise		1½	10
Wilson	F	1½	Own		Stromberg	M	1	Side				
Wilson	G	3½	Own		Stromberg	M	1¼	Side				
Wilson	H	5	Own		Stromberg	M	1½	Side				
Winther	751	¾-1	Herschell-S.	7000	Stromberg	MB	1	Side	Horizontal		1½	22
Winther	430	1¼	Wisconsin	CAU	Stromberg	M	2	Top	Lengthwise		1½	24
Winther	450	2¼	Wisconsin	EAU	Stromberg	M2	1¼	Top	Crosswise		1½	24
Witt Will.	22	1½-2	Continental	K4	Zenith	L5	1¼	Top				
Witt Will.	P	2½-3	Continental	K4	Zenith	L5	1¼	Top	Crosswise		1½	14

#—Inside Diameter.





## MORE TRUTH THAN POETRY

By J. W. LEAVITT,

of J. W. Leavitt & Co., Oakland distributors, San Francisco.

*I know a man who bought a car  
That cost a thousand "berries"  
And I have tried to draw a chart  
To show how value varies.*

*"A" represents its value, new—  
But 30 days of mud and sand,  
Soon brought its value down to "B"  
It then was second-hand.*

*Depreciation of one year  
Then brought it down to "C"  
But in the Spring, a coat of paint,  
Had brought it back to "D".*

*He drove it pretty hard that year,  
And treated it quite rough,  
I think its value—down at "E"  
Was easily enough.*

*Next Spring he got some brand new tires  
And bought another top  
It raised the line about to "F"  
But there it had to stop.*

*And then most everything went wrong,  
He swore that car was "punk"  
The value curve dropped down to "G"  
T'would bring that much as junk.*

*But if you think he "wrote it off"  
You're thinking tommyrot  
The curve did not keep curving down,  
It certainly did not.*

*He had to have another car,  
He'd trade the old one in,  
"H" shows the value placed on it,  
By Jones, of Motor Inn.*

*The other dealers got in line,  
The Sunnyside Garage,  
Boosted the "value" up to "I"  
Then came a swift barrage,*

*"J", "K" and "L" and even "M"  
Were reached in quick succession,  
The auto dealers bid it up  
And tried to take possession.*

*Well, that's the way I chart the curve,  
It isn't something new,  
Perhaps I'm guilty with the rest,—  
And so,—perhaps, are you.*

# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Bethlehem, Pa.	Closed Car Show at the Coliseum	Oct. 1-6
Chicago	Chicago Closed Car Show, Coliseum	Oct. 13-20
Chicago	Annual Salon, Drake Hotel	Jan. 26-Feb. 2
Columbus, Ga.	Automobile Show	Oct. 15-20
Dallas, Texas	Annual Fall Show	Oct. 13-28
Dallas, Texas	Annual Automobile Show	Feb. 11-17
Danbury, Conn.	Automobile Show in Conjunction with	
Fresno, Calif.	State Fair	Oct. 1-6
Little Rock, Ark.	Automobile Show	Sept. 28-Oct. 5
Louisville, Ky.	Annual Automobile Show	Oct. 8-13
Louisville, Ky.	Automobile Show at the Jefferson County	
Memphis	Annual Automobile Show	Sept. 28-30
New York	Annual Closed Car Show	Oct. 1-6
New York	Annual Electrical and Industrial Exposition	Oct. 17-27
New York	Foreign Automotive Association Exposition	Nov. 4-10
New York	Annual Salon, Hotel Commodore	Nov. 11-17
New York	National Automobile Show	Jan. 5-12
Peoria, Ill.	Implement and Vehicle Show	Sept. 26-Oct. 6
Pittsburgh	Annual Fall Show at the Motor Square	
Richmond, Ind.	Wayne County Fair Assn. Passenger	
Salt Lake City	Fall Show in Conjunction with State Fair	Oct. 1-6
Sioux City, Ia.	Automobile Show in Conjunction with	
Waco, Texas	Annual Automobile Show	Oct. 20-27
Washington, D. C.	Annual Fall Closed Car and Accessory	
Washington, D. C.	Show	Oct. 20-Nov. 5
Washington, D. C.	Annual Fall Automobile Show	Oct. 28-31

## FOREIGN SHOWS

Buenos Aires	Annual Automobile Exposition	Nov. 1-15
London	Motor Car Exposition	Nov. 2-10
Montevideo, Uruguay	Automobile Show	September
Montreal	Closed Car Show	Sept. 29-Oct. 6
Ottawa, Ont.	Automobile Show	Sept. 7-17
Paris	Automobile Show at Grand Palais	Oct. 4-10
Paris	Truck and Tractor Show at Grand	
	Palais	Oct. 24-Nov. 2

## RACES

Berkeley, Calif.	Thanksgiving
Fresno, Calif., Auspices of the A. A. A.	Sept. 29
Kansas City Speedway, Auspices of the A. A. A.	Oct. 17
Los Angeles	Nov. 29
Oakland, Calif.	Nov. 1

## CONVENTIONS

Boston, Mass.	Fall Convention, M. A. M. A.	Sept. 19-21
Chicago	Exhibit and Convention of Automotive	
	Equipment Association	Nov. 12-17
Cleveland, O.	Society of Automotive Engineers Production	
	Meeting	October
Cleveland, O.	Thirtieth Annual Convention, National Assn.	
	of Farm Equipment Manufacturers	Oct. 24-26
Columbus, O.	Annual Convention, Ohio Trade Assn.	Dec. 5-6
Detroit	S. A. E. Annual Meeting	Jan. 22-25
Eaglesmere Park, Pa.	Summer Meeting of the Automotive Electric	
	Association	Sept. 11-14
New York	National Tire Dealers' Assn. Convention	Nov. 13-15

# SQUEEKS & RATTLES

## "Howdy" Passes On

The race is over and the crowd is hushed.  
There are no cheers  
To hail the victor, for he is dead,  
And you and I ride on  
In safety, for he has made it so.

—Jinx.

## Between Relatives

By "Kay Em" Roberts

My uncle, down in Kankakee, wrote in the other day, to me, to ask me how I am, and I replied in accents terse, "I'm feeling punk and getting worse—I am not worth a . . .!" (yes, you guessed it) "I've corns and bunions on my toes, a wart has sprouted from my nose and half my teeth are gone, a pain shoots up and down my spine, my pulse beats throb and I opine that I'll be passing on. Old Doctor Sawbones, up the street, declares that I may chew no meat nor munch on shredded hay. Skim milk is what I need the most, says he, with half a slice of toast, and draws the line on whey. I'm in a sorry state, indeed, when I must shun the fragrant weed and drink no more home brew. I think this doctor is the bunk and I believe I'll ship my trunk and come to dwell with you." And yesterday a letter came from Kankakee with Uncle's name emblazoned at the end. "Don't wish yourself on me," he said, "I have no room to store the dead nor any coin to lend. My business here on Auto Row made me a bankrupt long ago and I am swamped with debts. You're ill, you say, and out of tune; I trust that you'll recover soon. Accept my kind regrets."

## The Ruling Passion

"MR. STARR," said the manager, "you positively must leave off letting your mind dwell so much upon your motor."

"Eh! Why?" asked the tragedian.

"Perhaps you are not aware of it, but in the third act, where you should have cried, 'Ye gods! I am stabbed!' you shouted: 'Ye gods! I am punctured!'"

That bird what wanted to be directed to Bendix Drive hasn't a thing on the dumb gluck which wanted to know what kind of a car Sheridan Road.—Cora Gate.

## The Song of the Open Cut-out

Let her roar!  
If there's anything I love to make,  
It's lots of noise—and then some more!  
When I'm heard coming down the road  
Folks pull 'way over—close to shore—  
I'm so full of noise I near explode—  
That's why my slogan's "Let Her Roar."

Let her roar!  
It always is to me a treat  
When I go down some quiet street;  
At early morn or late at night,  
Or when the sun is at its height,  
To open wide my throat and roar—  
My throat gets hot—but never sore!  
Let her roar!  
What do I care though babies sleep  
And sick folks on their beds may weep?  
I'm here for just one thing: to roar—  
And though these people may deplore  
My noise, and wish I'd come no more,  
I must keep on my roaring way,  
Regardless of what folks may say.

Let her roar!  
An automobile's good enough—  
But the motorcycle is the stuff!  
On these I roar with hellish glee  
While thinking what folks think of me.  
There is no joy that can compare  
With distressing people everywhere!

Let her roar!  
Though laws are passed to keep me still,  
Laughing at law gives me a thrill.  
A "cop" to me is just a dare—  
So I go roaring everywhere;  
The more annoyance I can give  
The more's the bliss with which I live.

—Harry Clatfelter.

A MAN, walking along a country road, found an Irishman perched upon a sign-post which pointed north, with the inscription: "This will take you to Malvern."

"What are you up there for?" asked the man.

"Faith!" said the other. "I've been sitting up here for two hours, and I'm wondering what time it starts."

LEW BRICATION.



# Current Motor Truck Specifications

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Ace.....30 1 1/2	1 1/2	\$2600	Mi-412	3 3/4 x 5	B-L	B-L	Ti-5560	WO.	34x3 1/2	34x5k
Ace.....40 2 1/2	2 1/2	3250†	Mi-402	4 1/2 x 5 1/4	B-L	B-L	Ti-6160	WO.	36x4k	36x7k
Ace.....60 3	3	3800†	Mi-102	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4	36x8
Acme.....20 1 1/2	1 1/2	.....	Co-N	3 3/4 x 5	B&B	Cot.	Ti-6250	WO.	34x5n	34x5n
Acme.....30 1 1/2	1 1/2	.....	Co-N	3 3/4 x 5	B&B	Cot.	Ti-6352	WO.	34x3 1/2	34x5
Acme.....40 1 1/2	1 1/2	.....	Co-J4	3 3/4 x 5	B&B	Cot.	Ti-6160	WO.	34x3 1/2	34x5
Acme.....60 2 1/2	2 1/2	.....	Co-K4	4 1/2 x 5 1/4	B&B	Cot.	Ti-5560	WO.	36x4	36x7
Acme.....90 3 1/2	3 1/2	.....	Co-B5	4 1/2 x 5 1/4	B&B	Cot.	Ti-6660	WO.	36x5	40x10
Acme.....125 5 1/2	5 1/2	.....	Co-B5	4 1/2 x 5 1/4	B&B	Cot.	Ti-6760	WO.	36x6	40x12
Amer. La France.....3 1/2	3 1/2	4950	Own	4 1/2 x 6	Own	Own	Own	WO.	36x5	36x5
Amer. La France.....5	5	5500	Own	4 1/2 x 6	Own	Own	Own	WO.	36x6	40x6
Armleder.....21 1 1/2	1 1/2	.....	Bu-GTU	3 3/4 x 5 1/4	Ful.	Ful.	Ti-6160	WO.	34x3 1/2	34x5k
Armleder.....HWC	.....	.....	Bu-HTU	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4k	36x4dk
Armleder.....HWC	.....	.....	Co-CA	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4k	36x4dk
Armleder.....KWB	.....	.....	Bu-YTU	4 1/2 x 6	B-L	B-L	Ti-6666	WO.	36x5k	36x5dk
Armleder.....KWB	.....	.....	Co-EL	4 1/2 x 5 1/4	B-L	B-L	Ti-6666	WO.	36x5k	36x5dk
Atlas.....25 1 1/2	1 1/2	1895	Bu-WTU	3 3/4 x 5 1/4	B&B	Own	Own	WO.	34x4 1/2	34x4 1/2
Atlas.....40 1 1/2	1 1/2	1950	Bu-WTU	3 3/4 x 5 1/4	B&B	Own	Own	WO.	36x6n	36x6n
Atterbury.....20R 1 1/2	1 1/2	2475	Co-J4	3 3/4 x 5	Ful.	Ful.	Ti-6160	WO.	34x4k	34x5k
Atterbury.....22C 2 1/2	2 1/2	3375b	Co-K4	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4k	36x4dk
Atterbury.....22D 2 1/2	2 1/2	41275b	Co-L4	4 1/2 x 5 1/4	B-L	B-L	Ti-6660	WO.	36x5	40x6d
Atterbury.....2E 5 1/2	5 1/2	1975b	Co-B2	4 1/2 x 6	B-L	B-L	Ti-6760	WO.	36x6	40x7d
Autocar.....21 1 1/2	1 1/2	2200†	Own	4 1/2 x 5 1/4	Own	Own	DR	34x4	34x6	34x6
Autocar.....27 2	2	3100†	Own	4 1/2 x 5 1/4	Own	Own	DR	34x6	36x12	36x12
Autocar.....27 2	2	4200†	Own	4 1/2 x 5 1/4	Own	Own	DR	34x6	36x12	36x12
Available.....HJ 1 1/2	1 1/2	2150	Ho-CU3	1 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4	36x8
Available.....HJ 1 1/2	1 1/2	3160	Ho-MU3	1 1/2 x 5 1/4	B-L	B-L	Ti-6666	WO.	36x5	40x5d
Available.....HJ 1 1/2	1 1/2	4175	Ho-T3	5x6	B-L	B-L	Ti-6760	WO.	36x6	40x12
Available.....HJ 1 1/2	1 1/2	5375	Own	3x4	Own	Own	To-OX2	IG.	34x5n	34x5n
Avery.....1 1 1/2	1 1/2	1450	Co-N	3 3/4 x 5	Ful.	Ful.	To-A	IG.	35x5n	35x5n
Bessemer.....G1 1 1/2	1 1/2	1995	Co-N	3 3/4 x 5	B&B	Bak.	LM-7150	DR	36x3 1/2	36x5
Bessemer.....H2 2 1/2	2 1/2	2895	Co-C2	4 1/2 x 5 1/4	B&B	B-L	LM-7250	DR	36x4	36x4d
Bessemer.....K2 1	1	3495	Co-E7	4 1/2 x 5 1/4	B&B	B-L	To-E	IG.	36x5	36x10
Bethlehem.....KN4	.....	1395	Own	3 3/4 x 5	B&B	Det.	Ea-1000	SB.	35x5n	35x5n
Bethlehem.....GN2	.....	2185	Own	4 1/2 x 5 1/4	B&B	Det.	Wi-60A	DR	34x4	34x6
Bethlehem.....HN3	.....	2985	Own	4 1/2 x 5 1/4	B&B	Det.	Wi-88E	DR	34x4	36x8
Brookway.....E2 1	1	.....	Wi-SU	1 1/2 x 5	B-L	B-L	Co-52001	SB.	33x5n	33x5n
Brookway.....K1 1/2	1 1/2	.....	Wi-SU	1 1/2 x 5	B-L	B-L	Ti-6160	WO.	36x4	36x6
Brookway.....K2 1/2	1 1/2	.....	Co-K4	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4	36x8
Brookway.....R3 1/2	1 1/2	.....	Co-L4	4 1/2 x 5 1/4	B-L	B-L	Ti-6666	WO.	36x5	36x5d
Brookway.....T5	.....	.....	Co-B5	4 1/2 x 6	B-L	B-L	Ti-6760	WO.	36x6	40x7d
Buick.....23-4 SD 3/4	3/4	945	Own	3 3/4 x 4 1/2	Own	Own	SB.	31x4n	31x4n	31x4n
Case.....TR2	.....	.....	Own	4 1/2 x 5 1/4	TD	Own	To-C139	IG.	36x6n	36x7n
Chevrolet.....Supr 1 1/2	1 1/2	395	Own	3 3/4 x 4	Own	Own	SB.	30x3 1/2	30x3 1/2	30x3 1/2
Chevrolet.....Util 1 1/2	1 1/2	550	Own	3 3/4 x 4	Own	Mun	SB.	31x4n	34x4 1/2	34x4 1/2
Clinton.....(See Schwartz)	.....	.....	Co-N	3 3/4 x 5	B&B	B-L	Ti-5511	SB.	34x5n	34x5n
Clydesdale.....10 1 1/2	1 1/2	.....	Co-K4	4 1/2 x 5 1/4	B-L	B-L	Ti-6160	WO.	36x4	36x7
Clydesdale.....8 1/2	8 1/2	.....	Co-L4	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x5	36x5d
Clydesdale.....4 1/2	4 1/2	.....	Co-B5	4 1/2 x 6	B-L	B-L	Ti-6666	WO.	36x6	40x6d
Clydesdale.....4 1/2	4 1/2	.....	Co-B5	4 1/2 x 6	B-L	B-L	Ti-6760	WO.	36x7	40x7d
Commerce.....3 1/2 1 1/2	1 1/2	.....	Co-N	3 3/4 x 5	Det.	Det.	Sa-D16	SB.	32x4 1/2	32x4 1/2
Commerce.....14 1 1/2	1 1/2	.....	Co-J4	3 3/4 x 5	B-L	B-L	Ti-5560	WO.	36x4	36x5k
Commerce.....25 2 1/2	2 1/2	.....	Co-K4	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4k	36x7k
Corbett.....3 1/2	3 1/2	.....	HS-700	3 3/4 x 5	B-L	B-L	Sh-100	WO.	34x4 1/2	34x4 1/2
Corbett.....E1	.....	.....	Co-N	3 3/4 x 5	B-L	B-L	Sh-100	WO.	34x3 1/2	34x4k
Corbett.....D 1 1/2	1 1/2	.....	Co-J4	3 3/4 x 5	B-L	B-L	Sh-150	WO.	34x3 1/2	34x5k
Corbett.....C2	.....	.....	Co-K4	4 1/2 x 5 1/4	B-L	B-L	Sh-103	WO.	36x3 1/2	36x7k
Corbett.....B 1/2	1 1/2	.....	Co-L4	4 1/2 x 5 1/4	B-L	B-L	Sh-21	WO.	36x4	36x8
Corbett.....R3	.....	.....	Co-L4	4 1/2 x 5 1/4	B-L	B-L	Sh-32	WO.	36x5	36x10
Corbett.....A 3 1/2	3 1/2	.....	Co-B5	4 1/2 x 6	Del.	Del.	Sh-51	WO.	36x6	40x12
Day-Elder.....AN 1 1/2	1 1/2	.....	Bu-WTU	3 3/4 x 5 1/4	B-L	B-L	Ti-6352	WO.	34x3 1/2	34x5
Day-Elder.....BN2	.....	.....	Co-K4	4 1/2 x 5 1/4	B-L	B-L	Ti-6160	WO.	34x3 1/2	34x5
Day-Elder.....CN3	.....	.....	Co-L4	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4	36x7
Day-Elder.....EN4	.....	.....	Bu-HTU	4 1/2 x 5 1/4	B-L	B-L	Ti-5560	WO.	36x4	36x8
Day-Elder.....EN5-6	.....	.....	Co-L4	4 1/2 x 5 1/4	B-L	B-L	Ti-6666	WO.	36x5	36x5d
Dearborn.....E1	.....	1600†	Bu-YTU	4 1/2 x 6	B-L	B-L	Ti-6760	WO.	36x5	40x6d
Dearborn.....F1 1/2	1 1/2	1980†	Bu-Mu	3 3/4 x 5 1/4	Ful.	Ful.	Wi	WO.	35x5n	35x5n
Dearborn.....482	.....	2390	Bu-WU	3 3/4 x 5 1/4	Ful.	Ful.	Wi	WO.	34x4 1/2	34x7
Denby.....31 1/2 1 1/2	1 1/2	1485	Co-N	3 3/4 x 5	Ful.	Ful.	Cl-B300*	SB.	34x5n	34x5n
Denby.....33 1/2	33 1/2	2375	Co-J4	3 3/4 x 5	Ful.	Ful.	Cl-D	IG.	35x5n	38x7n
Denby.....35 3	3	2975	Co-K4	4 1/2 x 5 1/4	Ful.	Ful.	Cl-2D	IG.	36x4	36x8
Denby.....27 1	27 1	3695	Co-L4	4 1/2 x 5 1/4	Ful.	Ful.	Cl-3D	IG.	36x5	36x5d
Denby.....210 5	210 5	4295	Co-B5	4 1/2 x 6	Ful.	Ful.	Cl-5D	IG.	36x6	40x6d
Denby.....214 7	214 7	4945	Co-B5	4 1/2 x 6	Ful.	Ful.	Ru	IG.	36x6	40x14
Dependable.....CD 1 1/2	1 1/2	2350	Bu-CTU	3 3/4 x 5 1/4	Ful.	Ful.	Wi-800J	WO.	34x5	34x8
Dependable.....EG 2 1/2	2 1/2	2950	Bu-ETU	4 1/2 x 5 1/4	Ful.	Ful.	Wi-900C	WO.	36x5	36x10
Diamond T.....O3 1 1/2	1 1/2	.....	Hi-700	3 3/4 x 5 1/4	Cov.	Cov.	Own	WO.	36x3 1/2	36x4
Diamond T.....T 1 1/2	1 1/2	.....	Hi-700	3 3/4 x 5 1/4	Cov.	Cov.	Ti-6160	WO.	36x3 1/2	36x5
Diamond T.....U2 2 1/2	2 1/2	.....	Hi-1400	4 1/2 x 5 1/4	Cov.	Cov.	Ti-5560	WO.	36x4k	36x8k
Diamond T.....K 3 1/2	3 1/2	.....	Hi-1500	4 1/2 x 5 1/4	Cov.	Cov.	Ti-6666	WO.	36x5	36x5d
Diamond T.....EL5	.....	.....	Hi-200	4 1/2 x 5 1/4	Cov.	Cov.	Ti-6760	WO.	36x6	40x6d
Diamond T.....S5	.....	.....	Co-B5	4 1/2 x 6	B-L	B-L	Ti-6760	WO.	36x6	40x6d
Dodge Brothers.....3/4	3/4	730	Own	3 3/4 x 4 1/2	Own	Own	SB.	32x4n	32x4n	32x4n
Doris.....K2 1	1	2490	Own	4 1/2 x 5 1/4	Own	War.	Ti-5512	IG.	33x5n	33x5n
Doris.....K-4 2 1/2	2 1/2	3400	Own	4 1/2 x 5 1/4	Own	War.	Ti-5560	WO.	36x4	36x7
Doris.....K-7 3 1/2	3 1/2	4400	Own	4 1/2 x 5 1/4	Own	War.	Ti-6660	WO.	36x7	36x10
Dut.....109 1/2	109 1/2	685b	Ly-K	3 3/4 x 5	Del.	Own	Pl-105	SB.	31x4n	31x4n

\*—Make Optional  
†—Short wheelbase model  
‡—6 cylinders  
§—All 4 cyl. engines unless otherwise specified  
||—Truck Tractor  
—Front wheel drive  
b—price includes body or cab  
d—dual  
k—pneumatic tires optional at extra cost  
n—pneumatic tires standard

ENGINE:  
Bu—Buda  
Co—Continental  
Do—Dodge  
Hi—Hercules  
Hi—Hinkley  
HS—Herschell-Spillman  
Ly—Lycorning  
Mi—Midwest  
Wa—Waukesha  
We—Weldel  
Wi—Wisconsin

CLUTCH & GEARSET  
B&B—Borg & Beck  
B-L—Brown-Lipe  
Bak—Baker  
Cam—Campbell  
Cot—Cotta  
Cov—Covert  
Del—Detlaf  
Det—Detroit  
Ful—Fuller  
H-S—Hels-Shaw  
Hoo—Hoosier  
M&E—Merchant & Evans

Mec—Mechanics  
Mun—Muncie  
T. D.—Twin Disc  
War—Warner

REAR AXLE:  
Am—American  
Cl—Clark  
Co—Columbia  
Du—Duron  
Ea—Eaton  
Fl—Flint  
LM—L-M

Ru—Russell  
Sa—Salsbury  
Sh—Sheldon  
Ti—Timken  
To—Torbensen  
Wa—Walker  
Wi—Wisconsin  
Ch—Chair  
DR—Double Reduction  
IG—Internal Gear  
SH—Spiral Bevel  
SP—Straight Bevel  
WO—Worm

## Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Larrabee...X2	1-1 1/2	...	Co-SR...	3 3/4x4 1/2	B-L	B-L	Sh-1480	SB...	34x5n	34x5n
Larrabee...J4	1 1/2	...	Co-J4...	3 3/4x5	B-L	B-L	Sh-1501	WO...	34x3 1/2	34x5k
Larrabee...K5	2 1/2	...	Co-L4...	4 1/2x5 1/2	B-L	B-L	Sh-22...	WO...	36x4	36x8
Larrabee...L4	3 1/2	...	Co-L4...	4 1/2x5 1/2	B-L	B-L	Sh-31...	WO...	36x5	36x10
Maccar...H2	1 1/2	...	Co-K4...	4 1/2x5 1/2	B-L	B-L	Ti-6460	WO...	36x4	36x6
Maccar...HA2	2	...	Co-K4...	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO...	36x4	36x4d
Maccar...H23	2 1/2	...	Co-L4...	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO...	36x4	36x5d
Maccar...M3	3	...	Co-L4...	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO...	36x5	36x6d
Maccar...G5-6	5-6	...	Co-B2...	3 3/4x5 1/2	B-L	B-L	Ti-6760	WO...	36x6	40x6d
MacDonald...O	7 1/2	\$5500b	Bu-WTU	3 3/4x5 1/2	B-L	B-L	**Own	IG...	36x10	36x10
MacDonald...A	7 1/2	8000b	Bu-YTU	4 1/2x6	B-L	B-L	**Own	IG...	40x7	40x14
Mack...AB1	1 1/2	3000	Own	4x5	Own	Own	Own	Ch...	36x3 1/2	36x3 1/2d
Mack...AB11	1 1/2	3450	Own	4x5	Own	Own	Own	DR...	36x4	36x3 1/2d
Mack...AB2	2	3300	Own	4 1/2x5	Own	Own	Own	Ch...	36x4	36x4d
Mack...AB2	2	3750	Own	4 1/2x5	Own	Own	Own	DR...	36x4	36x4d
Mack...AB2	2 1/2	3100	Own	4 1/2x5	Own	Own	Own	Ch...	36x4	36x4d
Mack...AB2	2 1/2	3850	Own	4 1/2x5	Own	Own	Own	DR...	36x4	36x4d
Mack...AC3	3	4950	Own	5x6	Own	Own	Own	Ch...	40x5d	40x5d
Mack...AC5	5	5500	Own	5x6	Own	Own	Own	Ch...	40x6d	40x6d
Mack...AC6	6	5750	Own	5x6	Own	Own	Own	Ch...	40x12	40x12
Mack...AC7	7	6000	Own	5x6	Own	Own	Own	Ch...	40x12	40x12
Mack...AB5	5	3400	Own	4 1/2x5	Own	Own	Own	Ch...	36x4	36x4d
Mack...AC7	7	4950	Own	5x6	Own	Own	Own	Ch...	40x5d	40x5d
Mack...AC10	10	5500	Own	5x6	Own	Own	Own	Ch...	40x6d	40x6d
Mack...AC13	13	5750	Own	5x6	Own	Own	Own	Ch...	40x12	40x12
Mack...AC15	15	6000	Own	5x6	Own	Own	Own	Ch...	40x7d	40x7d
Mason...11	1 1/2	1200	He...	4x5	Hoo	War	FL...	SB...	34x5n	34x5n
Master...11	1 1/2	...	Bu-WTU	3 3/4x5 1/2	Ful	Ful	Ti-5511	SB...	33x5n	33x5n
Master...21	2 1/2	...	Bu-OU	4 1/2x5 1/2	Ful	Ful	Ti-6460	WO...	34x4	34x6
Master...41	4 1/2	...	Bu-ETU	4 1/2x5 1/2	Ful	Ful	Ti-6560	WO...	34x4	36x8
Master...51	5 1/2	...	Bu-YTU	4 1/2x6	B-L	B-L	Ti-6666	WO...	40x10	40x10
Master...61	6 1/2	...	Bu-YTU	4 1/2x6	B-L	B-L	Ti-6760	WO...	36x5	40x12
Maxwell...1	1	1095	Own	3 3/4x4 1/2	Own	Own	Ti-6760	WO...	36x6	40x14
Menominee...B1	1	1650	Wi-SU...	4x5	B&B	Det	Co-5200	SB...	35x5n	35x5n
Menominee...HT	1 1/2	2000	Wi-FAU	3 3/4x5	Ful	Del	Wi-800G	WO...	34x3 1/2	36x5k
Menominee...H1	1 1/2	2175	Wi-FAU	4x5	Ful	Del	Wi-800H	WO...	36x3 1/2	36x5k
Menominee...D2	2 1/2	2875	Wi-RAU	4x6	Ful	Det	Wi-800J	WO...	36x8	36x8
Menominee...J5	5	4850	Wi-RAU	4 1/2x6	B&B	Det	Ti-6760	WO...	40x12	40x12
Moline...10	1 1/2	1995	Own	3 1/2x5	B&B	Own	To-A...	IG...	34x5n	36x8n
Moreland...R.R.1	1	1595	He-O...	4x5	B-L	B-L	Ti-5512	WO...	34x5n	34x5n
Moreland...BX1	1 1/2	1980	He-O...	4x5	B-L	B-L	Ti-6161	WO...	36x3 1/2	36x6
Moreland...EX2	2	2825	Co-K4...	4 1/2x5 1/2	Own	Own	Ti-6161	WO...	36x4	36x8
Moreland...AX3	3	3500	Co-L4...	4 1/2x5 1/2	Own	Own	Ti-6560	WO...	36x5	36x10
Moreland...RX5	5	4600	Co-B5...	4 1/2x6	Own	Own	Ti-6666	WO...	36x6	40x12
Nash...2018	1-1 1/2	1595	Own	3 3/4x5 1/2	B&B	Det	Cl-1D...	IG...	34x4	34x5
Nash...4017F	2-2 1/2	2750	Bu-HU...	4 1/2x5 1/2	B&B	Own	IG...	IG...	36x6	36x6
Nash...3018	2-2 1/2	2150	Own	3 3/4x5 1/2	B&B	Det	Cl-2D...	IG...	34x4	34x7
Nash...5018	2 1/2	2250	Own	3 3/4x5 1/2	B&B	Det	Cl-2D...	IG...	34x4 1/2	34x7 1/2
Noble...A-75	1	1395	Bu-WTU	3 3/4x5 1/2	Ful	Ful	Cl-300...	SB...	34x4 1/2	34x4 1/2
Noble...A-21	1 1/2	1890	Bu-WTU	3 3/4x5 1/2	Ful	Ful	Sh-1501	WO...	34x5	34x5
Noble...B-31	2	3795	Bu-CTU	3 3/4x5 1/2	Ful	Ful	Sh-103	WO...	36x4	36x7
Noble...D-51	2 1/2	3150	Bu-ETU	4 1/2x5 1/2	Ful	Ful	Sh-21...	WO...	36x4	36x8
Noble...E-71	3 1/2-5	3850	Bu-YTU	4 1/2x6	Ful	War	Sh-30...	WO...	36x5	36x10
Old Reliable...B	2 1/2	3500	Wi-UAT	4 1/2x6	Ful	Ful	Sh-21...	WO...	34x4	36x8
Old Reliable...C	3 1/2	4250	Wi-VAU	4 1/2x6	Ful	Ful	Sh-31...	WO...	36x5	36x12
Old Reliable...D5	5	5000	Wi-RAU	4 1/2x6	Own	B-L	Sh-51...	WO...	36x6	40x12
Old Reliable...K7	7 1/2	6000	Wa-P...	4 1/2x6 1/2	Own	Own	Own	Ch...	40x14	40x14
Oldsmobile...T1	1	1095	Own	3 3/4x5 1/2	B&B	War	To-OX2f	IG...	35x5n	35x5n
Oneida...B1	1 1/2	2825	Hi-400	1x3 1/4	Ful	Ful	Wi-800J	WO...	36x3 1/2	36x7
Oneida...C2	2 1/2	3200	Hi-400	1x3 1/4	Ful	Ful	Wi-900C	WO...	36x4	36x7
Oneida...D3	3 1/2	4050	Hi-200	1 1/2x3 1/2	Ful	Ful	Ti-6652	WO...	36x5	36x10
Overland...9lee	1 1/2	425	Own	3 3/4x4	B&B	Own	Own	SB...	30x3 1/2	30x3 1/2
Patriot, Revere...1	1	1295	Co-N...	3 3/4x5	B&B	Cov	Own	WO...	35x5n	35x5n
Patriot, Lincoln...2	2	2400	Hi-400	4x5 1/4	Cov	Ful	Ti-6560	WO...	34x4n	34x4n
Pat. Washington...3	3	3000	Hi-200	4 1/2x5 1/2	Cov	Cov	Wi-900	WO...	36x5n	36x8n
Pierce Arrow...XA2	2 1/2	3300	Own	4x5 1/2	Own	Own	Own	WO...	36x4	36x4d
Pierce Arrow...XB3	3 1/2	3500	Own	4x5 1/2	Own	Own	Own	WO...	36x5d	36x5d
Pierce Arrow...WC4	4	4600	Own	4 1/2x6 1/2	Own	Own	Own	WO...	36x6d	36x6d
Pierce Arrow...WD5	5	4700	Own	4 1/2x6 1/2	Own	Own	Own	WO...	40x7d	40x7d
Pierce Arrow...RE6	6	5100	Own	4 1/2x6 1/2	Own	Own	Own	WO...	40x7d	40x7d
Pierce Arrow...RF7	7	5200	Own	4 1/2x6 1/2	Own	Own	Own	WO...	40x8d	40x8d
Rainier...R31	3 1/2	...	Co-N...	3 3/4x5	B-L	B-L	Ti-6250	WO...	35x5n	35x5n
Rainier...R29	2 1/2	...	Co-N...	3 3/4x5	B-L	B-L	Ti-6250	WO...	34x3 1/2	34x4
Rainier...R36	3 1/2	...	Co-J4...	3 3/4x5	B-L	B-L	Ti-6460	WO...	34x3 1/2	34x5
Rainier...R28	2 1/2	...	Co-K4...	4 1/2x5 1/2	B-L	B-L	Sh-103	WO...	34x4	34x7
Rainier...R20	2 1/2	...	Co-K4...	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO...	36x4	36x8
Rainier...R25	2 1/2-5	...	Co-L4...	4 1/2x5 1/2	B-L	B-L	Ti-6666	WO...	36x5	36x5d
Rainier...R27	2 1/2	...	Co-B5...	4 1/2x6	B-L	B-L	Ti-6760	WO...	40x6d	40x6d
Reo...F1	1 1/2	1185	Own	4 1/2x4 1/2	Own	Own	Own	SB...	34x4 1/2	34x4 1/2
Reo...F1	1 1/2	1485n	Own	4 1/2x4 1/2	Own	Own	Own	SB...	33x4 1/2	33x4 1/2
Republic...75	3 1/2	1395b	Ly-KB...	3 3/4x5	Ful	Ful	To-750	IG...	33x5n	33x5n
Republic...11X	1 1/2	1795	Co-J4...	3 3/4x5	Ful	Ful	To-CT2	IG...	34x4	34x6
Republic...19W	2 1/2	...	Wa-FU...	4x5 1/4	Ful	Ful	To-CT2	IG...	36x4	36x8
Republic...19	2 1/2	2195	Co-K4...	4 1/2x5 1/2	Ful	Ful	To-CT2	IG...	36x4	36x8
Republic...20	2 1/2	3095	Co-L4...	4 1/2x5 1/2	Ful	Ful	To-E...	IG...	36x5	36x5d
Rowe...CW1	1 1/2	3000	Wi-CAU	3 3/4x5	B-L	B-L	Sh-1501	WO...	36x6n	36x6n
Rowe...CDW2	2 1/2	3300	Wi-EAU	4x5	B-L	B-L	Sh-103	WO...	36x3 1/2	36x3 1/2d
Rowe...CDW2	2 1/2	4150	Wi-NU...	4 1/2x5	B-L	B-L	Sh-21...	WO...	34x6	36x4d
Rowe...GSW3	3	4500	Wi-TAU	4x6	B-L	B-L	Sh-21...	WO...	36x6	36x6d
Rowe...FW1	1 1/2	4850	Wi-VAU	4 1/2x6	B-L	B-L	Sh-31...	WO...	36x7	36x8d
Rowe...FW5	5	895	HS...	3 1/2x5	M&E	Ful	Co...	SB...	32x4 1/2	32x4 1/2
Ruggles...15	3 1/2	1375	Own	4x5	B-L	B-L	Co-5200	SB...	34x5n	34x5n
Ruggles...20R	1 1/2	2095	Own	4x5	B-L	B-L	Wi-65	DR...	34x5n	34x7
Ruggles...40H	2 1/2	2295	Own	4x5	B-L	B-L	Wi-88E	DR...	36x8	36x8
Sandow...CG&G1	1	1795	Co-N...	3 3/4x5	Ful	Ful	Sh-1501	WO...	34x3 1/2	34x5
Sandow...J2 1/2	2 1/2	...	Co-C4...	4 1/2x5 1/2	B-L	B-L	Ti-6560	WO...	36x4	36x4
Sandow...M5	5	4325	Co-B5...	4 1/2x6	B-L	B-L	Ti-6760	WO...	40x12	40x12
Sandow...10 1/2-1 1/2	10 1/2-1 1/2	...	Co-SR...	3 3/4x5	B-L	B-L	Sh-1501	WO...	36x3 1/2	36x5k
Sandow...15 1/2-2	15 1/2-2	...	Co-N...	3 3/4x5	B-L	B-L	Sh-21...	WO...	36x4	36x4d
Sandow...25 1/										



## Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES		MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear				Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
CANADIAN																					
Walter.....M2	2	\$3600	Ow.....	4x5 1/2	B-L.	B-L.	Ow.....	DR.	36x4	36x8	Gotfredson.....20	1/2-1	\$1685	Bu-WTU	3 1/2 x 5 1/2	B-L.	B-L.	Ti-6250.	WO.	34x5n	34x5n
Walter.....S5	5	5100	Ow.....	4 1/2 x 5 1/2	B-L.	War.	Ow.....	DR.	36x6	40x6d	Gotfredson.....40	1 1/2-2	2300	Bu-GTU	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6460.	WO.	36x6n	38x7n
White.....15	3 1/4	2400	Ow.....	3 1/2 x 5 1/2	Ow.	Ow.	Ow.....	SP.	34x5n	34x5n	Gotfredson.....50	2 1/2	3900	Bu-EtU.	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6560.	WO.	36x4	36x8
White.....20	2	3250	Ow.....	3 1/2 x 5 1/2	Ow.	Ow.	Ow.....	DR.	36x4	36x7d	Gotfredson.....80 1/2		3975	Bu-YTU	4 1/2 x 5 1/2	B-L.	B-L.	Ti-6665.	WO.	34x5	36x12
White.....40	3 1/2	4200	Ow.....	4 1/2 x 5 1/2	Ow.	Ow.	Ow.....	DR.	36x5	40x5d	Gotfredson.....100 1/2		4800	Bu-BTU	5 1/2 x 5 1/2	B-L.	B-L.	Ti-6760.	WO.	36x6	40x14
White.....45	5	4500	Ow.....	4 1/2 x 5 1/2	Ow.	Ow.	Ow.....	DR.	36x6	40x6d	Mapleleaf.....1 1/2		3000	Hi-300.	3 1/2 x 5 1/2	Ful.	Ful.	Sh-1501.	WO.	34x5n	36x6n
Wilcox.....AA	1	1900	Bu-CTU	3 1/2 x 5 1/2	B-L.	B-L.	Ru-3600.	SP.	35x5	35x5	Mapleleaf.....AA 2		3600	Hi-400.	4 1/2 x 5 1/2	Ful.	Ful.	Sh-103.	WO.	36x4	36x7
Wilcox.....BB	1 1/2	2550	Ow.....	4 1/2 x 5	B&B.	Ow.	Wa-2A.	DR.	36x6k	38x7k	Mapleleaf.....BB 3		4050	Hi-500.	4 1/2 x 5 1/2	Ful.	Ful.	Sh-21.	WO.	36x4	36x7d
Wilcox.....CC	2 1/2	3000	Ow.....	4 1/2 x 5	B&B.	Ow.	Wa-25A.	DR.	36x6k	40x8k	Mapleleaf.....CC 4		4800	Hi-200.	4 1/2 x 5 1/2	Ful.	Ful.	Sh-31.	WO.	36x5	36x5d
Wilcox.....EE	3 1/2	3350	Bu-YTU	4 1/2 x 5 1/2	M&E.	Ow.	Wa-5A.	DR.	36x5	38x10	Mapleleaf.....DD 5		5625	Hi-1600.	4 1/2 x 5 1/2	Ful.	Ful.	Sh-51.	WO.	36x6	36x6d
Wilcox.....FF	5	4350	Bu-ATU	4 1/2 x 5 1/2	M&E.	Ow.	Wa-5A.	DR.	36x5	40x5	National.....FA 1			Wa-BUX	3 1/2 x 5 1/2	B-L.	B-L.	Ti-6352.	WO.	35x5n	35x5n
Wilson.....C	1	1350	He-O.	4 x 5	B&B.	Det.	Ti-6532.	WO.	34x5n	34x5n	National.....GA 1 1/2			Wa-BUX	3 1/2 x 5 1/2	B-L.	B-L.	Ti-6460.	WO.	34x4k	34x6k
Wilson.....F	1 1/2	2270	Co-J4.	3 1/2 x 5 1/2	B&B.	Cot.	Ti-5460.	WO.	36x3 1/2k	36x5k	National.....HD 2 1/2			Wa-CU.	4 1/2 x 5 1/2	H-S.	B-L.	Ti-6560.	WO.	36x5	36x10
Wilson.....EA	2 1/2	2825	Co-K4.	4 1/2 x 5 1/2	B&B.	Cot.	Ti-6560.	WO.	36x4k	38x7k	National.....NB 3 1/2			Wa-DU.	4 1/2 x 5 1/2	H-S.	B-L.	Ti-6666.	WO.	36x6	40x12
Wilson.....G	3 1/2	3685	Co-L4.	4 1/2 x 5 1/2	B&B.	Cot.	Ti-6660.	WO.	36x5k	36x5d	National.....OA 5			Wa-EU.	5 1/2 x 6 1/2	H-S.	B-L.	Ti-6760.	WO.	36x7	40x14
Wilson.....H	5	4520	Co-B2.	4 1/2 x 6	B&B.	Cot.	Ti-6752.	WO.	36x6k	40x6dk	Veteran.....M 1 1/2		2699	Bu-CTU	3 1/2 x 5 1/2	B&B.	Cot.	Sh-1501.	WO.	34x5n	34x5n
Yellow Cab. M22	3 1/4	1590	Co-V4.	3 1/2 x 5 1/2	B-L.	B-L.	Ti-5762.	SB.	33x4 1/2n	33x4 1/2n	Veteran.....P 2		3699	Bu-HTU	4 1/2 x 5 1/2	B&B.	Cot.	Sh.	WO.	36x4	36x7
Yellow Cab. M22 1/4	1 1/4	1640	Co-V4.	3 1/2 x 5 1/2	B-L.	B-L.	Ti-6352.	WO.	35x5n	35x5n	Veteran.....R 3		4200	Bu-HTU	4 1/2 x 5 1/2	B&B.	Cot.	Sh-21.	WO.	36x4	36x7
Yellow Cab.....	1-1 1/4	1740	Co.....	3 1/2 x 5 1/2	B-L.	B-L.	Ti.....	WO.			Veteran.....S 4		5395	Bu-YTU	4 1/2 x 6	B&B.	Cot.	Sh-31.	WO.	36x5	36x10

## Current Tractor Specifications

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE				MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE				MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE				
				Make	No. of Cyls. Bore & Stroke	Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)					Make	No. of Cyls. Bore & Stroke	Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)					Make	No. of Cyls. Bore & Stroke	Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)	
Allis-Chalmers...	0-12	1	\$295	LeR.	4-3 1/2 x 4 1/2	2500	48x 6	Gray.....DU	18-36	4	2150	Wau.	4-12 x 6 1/2	6200		Rumely OilPull	30-60	8-10		Ow.	2-10x12	26700	80x30	
Allis-Chalmers...	15-25	3	1185	Mid.	4-4 1/2 x 5 1/2	4700	46x12	Gray.....EU	22-40	4	2385	Ow.	4-5 x 6 1/2	6900		Russell.....	15-30	3-4		Cli.	4-5 x 6 1/2	6000	56x14	
Allis-Chalmers...	20-35	4	1885	Ow.	4-4 1/2 x 5 1/2	6150	50x12	Hart-Parr.....20	20	2		Ow.	2-5 1/2 x 6 1/2	4438	46x10	Russell.....	20-40	4-5		Cli.	4-5 1/2 x 7	7900	60x16	
Allwork.....D	20-38	4-5	1695	Ow.	1-5 x 7	6500	48x14	Hart-Parr.....30	30	3		Ow.	2-6 1/2 x 7	5220	52x10	Russell.....	30-60	8-10		Ow.	4-8 x 10	22550	84x22	
Allwork.....G	14-28	3	1495	Ow.	1-4 1/2 x 6	4800	48x12	Hart-Parr.....(Road)	30	3		Ow.	2-6 1/2 x 7	7560	52x18	Shaw-Enechs (Gr.)	30-60	8-10		LeR.	4-3 1/2 x 4 1/2	4400	48x 8	
Allwork.....C	16-30	3	1295	Ow.	1-5 x 6	5200	48x12	Heider.....D	9-16	2		Wau.	4-12 x 5 1/2	4000	54x 8	Topp-Stewart.....B	30-45	4		Wau.	4-12 x 6 1/2	7800	42x12	
Aultman-Taylor.....	15-30	3-4	1900	Cli.	1-5 x 6 1/2	7800	70x12	Heider.....C	12-20	3		Wau.	4-12 x 6 1/2	6000	57x10	Toro.....	6-10	2	\$675	LeR.	4-3 1/2 x 4 1/2	2900	41x 9	
Aultman-Taylor.....	22-45	4-6	3100	Ow.	1-5 1/2 x 8	12500	70x20	Heider.....M	5-10	3		LeR.	4-3 1/2 x 4 1/2	2800	46x 6	Townsend.....	10-20	2-3	800	Ow.	2-6 1/2 x 7	4500	48x12	
Aultman-Taylor.....	30-60	8-10	1400	Ow.	1-7 x 9	22500	90x24	Huber.....(Light 4)	12-25	3	985	Wau.	4-12 x 5 1/2	5000	60x10	Townsend.....	15-30	3-4	1350	Ow.	2-7 x 8	6500	56x18	
Avery.....	15-30	3-4	1900	Ow.	1-4 1/2 x 6	4750	50x12	Huber.....(Super 4)	15-30	3		Mid.	4-12 x 5 1/2	6000	60x10	Townsend.....	25-50	4-8	2500	Ow.	2-8 1/2 x 10	11500	60x24	
Avery.....	20-35	4-5		Ow.	1-4 1/2 x 7	7500	60x16	LaCrosse.....M	6-12	1	500	Ow.	2-4 x 6	3000	48x 7	Traylor.....	6-12	1	500	LeR.	4-3 1/2 x 4 1/2	1750	38x10	
Avery.....	25-50	5-6		Ow.	1-6 1/2 x 7	12500	69x20	LaCrosse.....H	12-24	3	850	Ow.	2-6 x 7	3800	56x10	Twin City.....	12-20	3	1200	Ow.	1-4 x 6	4550	50x12	
Avery.....	45-65	8-10		Ow.	1-7 1/2 x 8	22000	87 1/2 x 21	Lauson.....S	12-25	3	850	Mid.	4-12 x 5 1/2	4200	56x10	Twin City.....	20-35	4	2750	Ow.	4-5 1/2 x 6 1/2	8100	60x20	
Avery, Tr. Runner.....	3			Ow.	1-4 x 5 1/2	5000	x 8 1/2	Lauson.....T	15-30	4		Bea.	4-12 x 6	6200		Twin City.....	40-65	8	4750	Ow.	4-7 1/2 x 9	23700	84x24	
Avery, Road Racer.....	3			Ow.	6-3 x 8 1/2	4600	42x 6	Leader.....B	12-18	2	375	Ow.	2-6 1/2 x 6	4800	50x12	Uncle Sam.....C-20	12-20	2-3	990	Hor.	4-4 x 5	3000	46x12	
Bates (St. Mule) H.....	15-25	3		Mid.	1-4 1/2 x 5 1/2	3600	48x10	Leader.....N	16-32	3-4	1275	Cli.	4-5 x 6	5800	52x12	Uncle Sam.....B-19	20-30	3-4	1535	Bea.	4-4 1/2 x 6	4650	50x12	
Bates (St. Mule) F.....	18-25	3		Mid.	1-4 1/2 x 5 1/2	4850	56x10	Leader.....GU	16-32	3-4	2150	Cli.	5 x 6	5800	56x 9	Uncle Sam.....D-21	20-30	3-4	1485	Bsa.	4-4 x 6	4600	50x12	
Bates (St. Mule) G.....	25-35	4		Mid.	1-4 x 6	6500	x10	Lincoln.....A	15-30	3	1600	Bud.	4-12 x 6	5000	40x14	Wallis.....OK	15-27	3		Ow.	4-4 1/2 x 5 1/2	3660	48x12	
Bates (St. Mule) 40.....	40-40			Mid.	1-4 x 6	8500	*84x10	Little Giant.....B	16-22	4		Ow.	1-12 x 5	5200	54x14	Waterloo Boy.....N	12-25	3		Ow.	2-6 1/2 x 7	5869	52x12	
Best.....	25-35	4	1250	Ste.	1-4 1/2 x 6 1/2	6000	*61x12	Little Giant.....A	26-35	6		Ow.	4-5 1/2 x 6	8700	66x20	Wetmore.....	12-25	3	1185	Wau.	4-4 x 6 1/2	2900	46x12	
Best.....	30-40	4		Ow.	1-4 1/2 x 6 1/2	8100	*68x11 1/2	Lombard.....	100	12-16		Ow.	6-5 1/2 x 7	19000	x12	Wisconsin.....	16-30	3-4	1750	Cli.	4-5 x 6 1/2	5600	52x12	
Best.....	60-100	9		Ow.	1-6 1/2 x 8 1/2	18580	*89x20	Lombard.....	12-25	3		Mid.	4-12 x 5 1/2	48x12	Wisconsin.....	22-40	4-5	2550	Cli.	4-5 1/2 x 7	7500	52x12		
Bryan.....	15-30	3	2500	Ow.	2-4 x 5	5500	52x12	McCork-Deering.....	10-20	2	850	Ow.	4-12 x 5	3700	42x12	Yuba (Ball Tread).....	15-25	4	2750	Wis.	4-4 x 6	5750	*36x12	
Cass.....	12-20	3	1095	Ow.	1-4 1/2 x 5	4230	42x12	McCork-Deering.....	15-30	3	1250	Ow.	4-12 x 5 1/2	5750	50x12	Yuba (Ball Tread).....	25-40	8	4500	Ow.	4-5 1/2 x 7	10130	*48x17 1/2	
Cass.....	15-27	3-4	1350	Ow.	1-4 1/2 x 6	6000	52x14	Minneapolis.....	12-25	3		Ow.	4-12 x 7	6600	56x12									
Cass.....	22-40	4-5	2850	Ow.	1-5 1/2 x 6 1/2	10700	56x16	Minneapolis.....	17-30	3-4		Ow.	4-12 x 7	1090	54x12									
Cass.....	40-72	8-10	1900	Ow.	1-7 x 8	21200	72x20	Minneapolis.....	22-44	4-5		Ow.	4-6 x 7	12410	82x20									
Caterpillar.....2 Ton	15	3		Ow.	1-4 x 5 1/2	4000	*	Minneapolis.....	35-70	8-10		Ow.	4-7 1/2 x 9	22500	85x30									
Caterpillar.....5 Ton	25	4		Ow.	4-12 x 6	9400	*	Moline (Un.).....D	9-8	2-3	725	Ow.	4-3 1/2 x 5	4103	52x 8	Aro.....F	3-6	1	\$385	Ow.	1-4 1/2 x 5	1000	30x 4	
Caterpillar.....10 Ton	40	6		Ow.	1-6 1/2 x 7	20000	*	Moline (Or.).....D	9-8	2-3	725	Ow.	4-3 1/2 x 5	3893	44x 8	Beeman.....Jr.	1 1/2-1		195	B&S.	1-2 1/2 x 2 1/2	210	30x 3	
Clatrac.....F	9-16	2	845	Ow.	1-3 1/2 x 4 1/2	1930	*42x 5 1/2	Monarch.....C	20-30	4	3800	Bea.	4-12 x 6	8700	*66x12	Beeman.....K	1 1/2-1		265	Ow.	1-3 1/2 x 4 1/2	550	25x 3 1/2	
Clatrac.....W	12-20	2	1345	Ow.	1-4 x 5 1/2	3455	*48x 8	Monarch.....E	25-40		5000	Bea.	4-12 x 6	12000	*67x12	Bolens.....	1	180	B&S.	1-2 1/2 x 2 1/2	190	10x 3		
Eagle.....	12-22	3		Ow.	2-7 x 8	5850	48x12	Monarch.....D	35-60		6000	Bea.	6-12 x 6	15000	*90x12	Centaur.....1923	2 1/2-5	1	345	N-W.	1-4 1/2 x 4 1/2	700	28x 4	
Eagle.....H	16-30	4		Ow.	2-8 x 8	7100	48x12	Nichols-Shepard.....20	42	4-6	2600	Ow.	2-8x10	13500	64x20	Do-It-All.....(Jack)	2 1/2-6	1	395	Ow.	1-3 1/2 x 5	750		
E-B.....AA	12-20	3		Ow.	4-12 x 5	4550	54x12	Nichols-Shepard.....25	60	6-8	3320	Ow.	2-9x12	20500	69x28	Do-It-All.....(Baby)	2 1/2-6	1	495	Ow.	1-4 x 5	1200	26x 2 1/2	
E-B.....A	12-20	3		Ow.	4-12 x 5	4550	54x12	Nichols-Shepard.....35	70	6-10	4030	Ow.	2-10x14	30000	73x32	Do-It-All.....(Twins)	2 1/2-15	1	495	Ow.	2-3 1/2 x 7	800	22x 5 1/2	
E-B.....Q	16-32	3		Ow.	4-5 1/2 x 7	9400	72x16	Pioneer.....C	40-75	4	4030	Ow.	4-5 1/2 x 8	4500	60x18	Kirkade.....	15-30	2	190	Ow.	1-3 1/2 x 4	180	22x 5 1/2	
Faguel.....	19-12	4	1200	Lye.	4-3 1/2 x 5	3600	48x 8 1/2	Pioneer.....C	40-75	4		Ow.	4-7 x 8	24000	90x24	M.B.M. Red.....E	1-4 1/2		250	Ow.	2-3 1/2 x 4	140	20x 3	
Fordson.....	-18	2	395	Ow.	4-4 x 5	2562	42x12	Rumely OilPull.....12	20	3		Ow.	2-6 x 8	6682	51x12	Motor Maculatorator.....N.B.	2	6	1	375	Ow.	2-2 1/2 x 4	750	32x 4
Frick.....A	12-20	2	1000	Erd.	4-4 x 6	5800	60x10	Rumely OilPull.....16	30	4		Ow.	2-7 x 8 1/2	9600	56x16	Utilitor.....501	2 1/2-4	1	295	Ow.	1-3 1/2 x 4	750	24 1/2 x 4	
Frick.....CI	15-28	3	1800	Bea.	4-12 x 6	6730	60x12	Rumely OilPull.....20	40	6		Ow.	2-8 x 10	12820	64x20	Utilitor.....501A	2 1/2-4	1	340	Ow.	1-3 1/2 x 4	925	24 1/2 x 4	

## Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)		Tire Size (Ins.)		NAME AND MODEL		ENGINE				ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE		
OPEN MODELS			CLOSED MODELS									Make and Model	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make				Type and Make	Gear Ratio	DRUMS, Service and Emergency
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.																	
\$1950c	\$1785	\$1850	\$1885c	\$2250	\$2485		127	33x4 1/2	American.....D-66	H.S. 11000	6-3 1/2x5	29.40	Strom...	G-D...	A-K...	s-p B&B.	B & B...	m Hart	F Salis	4.50	RL-R		
	1195		1395c		1495	d1795p	114	32x4	Anderson.....41	Cont...6 Y	6-3 1/2x4 1/2	23.44	Zenith...	West...	West...	s-p B&B.	Durston.	f Univ.	3/4 F Salis	4.75	RL-R		
1495	1495	1505	1785b	1995c	1995d		122	32x4	Anderson.....Series 50	Cont...8 R	6-3 1/2x4 1/2	27.34	Rayfield.	Remy.	Remy.	s-p B&B.	Durston.	f Univ.	3/4 F Salis	1.62	RL-R		
	1535		1915c		2200		132	33x4	Anderson.....Series 50	Cont...8 R	6-3 1/2x4 1/2	27.34	Rayfield.	Remy.	Remy.	s-p B&B.	Durston.	f Univ.	3/4 F Salis	1.62	RL-R		
	2800	2900			3750	\$3850	120	32x4	Apperson.....6	Own...	6-3 1/2x4 1/2	23.44	Strom...	Remy.	Remy.	s-p Rock.	Mech...	m Thie.	3/4 F Col.	5.10	RL-R		
	1095		1325d	1495c	1595		130	33x5	Apperson.....8-23-S	Own...	8-3 1/2x5	33.80	Johnson.	Bijur.	Remy.	m-d Own.	Own...	m Thie.	3/4 F Own	4.25	RL-R		
	1595		1850d				114	31x4	Auburn.....6-43	Cont...6 Y	6-3 1/2x4 1/2	23.44	Strom...	Remy.	Remy.	s-p B&B.	Warner.	m Dett.	3/4 F Col.	4.60	RL-R		
					2345		122	32x4 1/2	Auburn.....6-63	Own...	6-3 1/2x5	25.35	Strom...	Remy.	Remy.	s-p B&B.	Warner.	m Thie.	3/4 F Col.	4.60	RL-R		
	1395		1495d		1850	2250p	118	32x4	Barley.....	Cont...6 Y	6-3 1/2x4 1/2	23.44	Strom...	Delco.	Delco.	s-p B&B.	Fuller...	f M&E.	3/4 F Col.	5.10	RL-R		
	935	965		800g	1395c	1495	109	31x4	Buick.....1924	Own...	4-3 1/2x4 1/2	18.23	Marvel.	Delco.	Delco.	m-d Own.	Own...	m Own.	3/4 F Own	4.66	FL-R		
	1275	1295		1135g	1995c	1695	120	32x4	Buick.....1924	Own...	6-3 1/2x4 1/2	27.34	Marvel.	Delco.	Delco.	m-d Own.	Own...	m Own.	3/4 F Own	4.70	FL-R		
	1385g		1565	1675a	2235d		128	33x4 1/2	Buick.....1924	Own...	6-3 1/2x4 1/2	27.34	Marvel.	Delco.	Delco.	m-d Own.	Own...	m Own.	3/4 F Own	4.70	FL-R		
	2885	2885	2885	3675c	3950	4300g	132	33x5	Cadillac.....61	Own...	8-3 1/2x5 1/2	31.25	Own...	Delco.	Delco.	m-d Own.	Own...	m Spicer	F Tim	Opt.	RL-R		
	1750	1790		2230d	2480c	2675	122	32x4 1/2	Case.....X	Cont...8 R	6-3 1/2x4 1/2	27.34	Rayfield.	Delco.	Delco.	m-d Own.	Own...	f Sneed.	3/4 F Col.	5.09	RL-R		
			199	1950c		3325	129	33x5	Case.....Y	Cont...6 T	6-3 1/2x4 1/2	31.54	Rayfield.	Delco.	Delco.	m-d Own.	Own...	f Sneed.	3/4 F Col.	4.09	RL-R		
		1185		1335d		1535	117	32x4	Chalmers.....1923	Own...	6-3 1/2x4 1/2	25.35	Strom...	A-L...	Remy.	m-d Own.	Own...	m Hardy	3/4 F Ad.	5.13	RL-R		
	1595	1485	1635	1785c		2095	122	32x4	Chalmers.....1923	Own...	6-3 1/2x4 1/2	25.35	Strom...	A-L...	Remy.	m-d Own.	Own...	m Hardy	3/4 F Ad.	5.13	RL-R		
		1685			1785	2385	123	32x4	Chandler.....Six	Own...	6-3 1/2x5	29.40	Strom...	Bosch.	Bosch.	s-p B&B.	Own...	f Own	3/4 F Own	4.45	RL-R		
	490	495	395g		795		103	30x3 1/2	Chevrolet...Superior	Own...	4-3 1/2x4	21.76	Zenith.	Remy.	Remy.	e Own.	Own...	m Own.	3/4 F Own	3.77	RL-R		
	1085	1045		1145d	1245	1365	112 1/2	31x4	Cleveland.....42	Own...	6-3 1/2x4 1/2	22.50	Strom...	Bosch.	Bosch.	s-p B&B.	Own...	m Mech.	3/4 F Own	4.90	RL-R		
		2175	2175	1295d	1345	1545	127 1/2	33x5	Cole.....Master	Nort.M309	8-3 1/2x4 1/2	39.20	Johnson.	Delco.	Delco.	m-d Nort.	Nort...	m Spicer	F Col.	4.70	RL-R		
	985c	1095		1395d	1295	1495	115	32x4	Columbia...Big Six	Cont...8 R	6-3 1/2x4 1/2	27.34	Strom...	A-L...	A-K...	s-p B&B.	Durston.	m Spicer	3/4 F Tim	4.75	RL-R		
	1250		1195	1595c	1595	1595	115	31x4	Columbia...Light Six	Cont...6 Y	6-3 1/2x4 1/2	23.44	Strom...	A-L...	A-L...	s-p B&B.	Durston.	m Spicer	3/4 F Tim	5.10	RL-R		
1395p	1295		1595c	1495	2195p	1895	116	32x4	Courier.....	Falls. 8000	6-3 1/2x4 1/2	23.44	Strom...	West...	A-K...	s-p B&B.	Muncie.	f Flex.	3/4 F Col.	5.10	RL-R		
	3100	3130		3500c		4500	138	33x4 1/2	Crawford...23-6-70	Cont...6 T	6-3 1/2x5 1/2	31.54	Zenith...	West...	Bosch.	m-d B-L...	B-L...	m Spicer	3/4 F Tim	4.23	RL-R		
	5800	6300		7650		142	33x5	Crawford-Dagmar.6-70	Cont...6 T	6-3 1/2x5 1/2	31.54	Zenith...	West...	Bosch.	m-d B-L...	B-L...	m Spicer	3/4 F Tim	4.23	RL-R			
	5000	4650	4700	4650c	6350	6450	132	33x5	Cunningham.V4	Own...	8-3 1/2x5	45.00	Strom...	Delco.	Delco.	m-d Own.	Own...	f Sneed.	3/4 F Tim	4.23	RL-R		
		5000	4800		5600		132	33x5	Daniels.....23-38	Own...	8-3 1/2x5 1/2	39.20	Zenith.	Delco.	Delco.	m-d Own.	Own...	m Spicer	F Tim	4.23	RL-R		
	1295	1295	1495c		1595	1795c	115	31x4	Daniels.....23-38	Own...	8-3 1/2x5 1/2	39.20	Zenith.	Delco.	Delco.	m-d Own.	Own...	m Spicer	F Tim	4.23	RL-R		
	1595	1595	1695d	2095			120	32x4 1/2	Davis.....71	Cont...7 U	6-3 1/2x4 1/2	23.44	Strom...	Delco.	Delco.	s-p B&B.	Warner.	m M&E.	3/4 F Tim	5.10	RL-R		
	850	880	730g	1035	1250		116	32x4	Davis.....63	Cont...8 R	6-3 1/2x4 1/2	27.34	Strom...	Delco.	Delco.	s-p B&B.	Warner.	m Peters	3/4 F Tim	5.15	RL-R		
					1385				Dodge Brothers	Own...	4-3 1/2x4 1/2	24.03	Stewart.	N.E.	N.E.	m-d Own.	Own...	m Own.	3/4 F Own	4.16	RL-R		
	3950	3950	4150c	4985c	5550	5900	136	33x5	Dorris.....6-80	Own...	6-4 x5	38.40	Strom...	West...	Bosch.	m-d Own.	Warner.	m Spicer	3/4 F Tim	4.23	RL-R		
	870	885	995c	1240	1350		108	31x4	Dort.....23-18	Lye...KB	4-3 1/2x5	19.60	Carter.	Bosch.	Bosch.	m-d Det.	Own...	m Mech.	3/4 F Tim	4.66	RL-R		
	1010	1025	1135c	1355	1465		115	31x4	Dort.....25-20	Falls T8000	6-3 1/2x4 1/2	23.44	Carter.	Bosch.	Bosch.	m-d Det.	Own...	m Mech.	3/4 F Tim	4.66	RL-R		
	5750	5500	5900	6750c	7250	7500	134	33x5	Duesenberg.Straight 8	Own...	8-2 1/2x5	26.45	Strom...	Delco.	Delco.	s-p Own.	Own...	f Chi.	3/4 F Own	4.45	FL-R		
	890	890	1065d	1305	1365		109	31x4	Durant.....A-22	Cont.Spec	4-3 1/2x4 1/2	24.03	Till...	A-L...	A-L...	s-p Own.	Warner.	m Spicer	3/4 F Ad.	4.33	RL-R		
	1600	1650		2250	2400		123 1/2	32x4 1/2	Durant.....B-22	Anst...D	6-3 1/2x4 1/2	25.35	Rayfield.	A-L...	A-L...	s-p Anst.	Warner.	m f Spi	3/4 F Tim	5.15	RL-R		
	1485	1095	1275d	1395c	1595		112	32x4	Earl.....40	Own...	4-3 1/2x5 1/2	18.01	Seco.	A-L...	Conn.	s-p B&B.	Own...	f Own.	3/4 F Own	4.87	RL-R		
		995	1135		1425		112	31x4	Elcar.....4-40	Lye...K	4-3 1/2x5	21.03	Strom...	Delco.	Delco.	s-p B&B.	Warner.	m Peters	3/4 F Salis	1.56	RL-R		
	1395	1395	1595d	1975	1995		118	32x4	Elcar.....6-60	Cont...7 R	6-3 1/2x4 1/2	27.34	Strom...	Delco.	Delco.	m-d War.	Warner.	m Spicer	3/4 F Salis	4.50	RL-R		
		1045		1145	1145		108 1/2	32x4	Essex.....	Own...	4-3 1/2x5	18.23	Own...	Bosch.	Bosch.	m-d Own.	Own...	m Spicer	3/4 F Own	4.66	RL-R		
	1195	1195		1195	1895c	1985	120	32x4 1/2	Flint.....	Cont.Spec	6-3 1/2x5	27.34	Strom...	DeJon.	DeJon.	s-p Own.	Warner.	m Spicer	3/4 F Ad.	4.33	RL-R		
	269r	208h	235g	530	725		100	30x3 1/2	Ford.....T	Own...	4-3 1/2x4	22.50	Own...	Holley.	Own...	m-d Own.	Warner.	m Own.	3/4 F Own	3.63	RL-R		
	2975	2975		3975	3975		132	32x4 1/2	Fox.....Air-Cooled	Own...	6-3 1/2x5	27.34	Zenith.	West...	Scintilla	m-d B-L...	B-L...	m Spicer	3/4 F Tim	4.90	RL-R		
		1950		2750c	2250	\$2950d	115	32x4	Franklin.....10	Own...	6-3 1/2x4	25.35	Own...	A-K...	A-K...	s-p B&B.	Own...	m Spicer	3/4 F Own	4.73	RL-R		
	995	995	1145c	1145	1445		112	32x4	Gardner...Series 5	Lye...CE	4-3 1/2x5	21.76	Zenith.	West...	West...	s-p B&B.	Mech...	m Peters	3/4 F Tim	3.90	RL-R		
	490	530		750	785		100	30x3 1/2	Gray.....	Own...	4-3 1/2x4	21.03	Seco.	West...	West...	s-p Own.	Own...	m Mech.	3/4 F Tim	3.90	RL-R		
	2250	2250		2850d	2600		120	32x4 1/2	H.C.S...Series 4	Weid...	4-3 1/2x5 1/2	22.50	Strom...	Delco.	Delco.	m-d B-L...	B-L...	m Spicer	3/4 F Own	4.63	RL-R		
		2650					126	32x4 1/2	H.C.S...Series 6	Midw...	6-3 1/2x5	29.40	Strom...	Delco.	Delco.	m-d B-L...	B-L...	m Spicer	3/4 F Own	4.36	RL-R		
	1350		1350d		1750		115	32x4 1/2	Handley.....6-40	Falls T8000	6-3 1/2x4 1/2	23.44	Strom...	Bosch.	Bosch.	m-d Mech.	Mech...	m Mech.	3/4 F Tim	4.90	RL-R		
		2150					125	32x4 1/2	Handley.....6-60	Midw...	6-3 1/2x5	27.34	Strom...	Delco.	Delco.	m-d	Own...	m	3/4 F Tim	4.90	RL-R		
	1395	1395	1495c		2195		121	32x4	Hanson.....66	Cont...8 R	6-3 1/2x4 1/2	27.34	Marvel.	Delco.	Delco.	s-p B&B.	G-L...	m Univ.	3/4 F Tim	4.66	RL-R		
		1345	1345c		1950	1950	115	32x4	Hatfield.....A-42	H.S. 7000	4-3 1/2x5	19.60	Zenith.	Dyneto	Conn.	s-p B&B.	G-L...	m Spicer	3/4 F Col.	4.66	RL-R		
</																							





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**“EXPECT GREAT THINGS”**

**"EXPECT GREAT THINGS"**

CADILLAC MOTOR CAR COMPANY, DETROIT, MICHIGAN  
*Division of General Motors Corporation*

*Division of General Motors Corporation*

## Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	Make and Model	ENGINE		ELECTRICAL SYSTEM		Clutch, Type and Make	Gearset Make	Universal Type and Make	REAR AXLE		
OPEN MODELS			CLOSED MODELS							No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make				Ignition Make	Type and Make	Gear Ratio
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.													
12385	\$1895	\$2385	\$2385c	3375	3075	124	32x4 1/2	Kissel.....45	Own.....	6-3 1/2x5 1/2	26.38	Strom.	Remy.	Remy.	m-d War.	Warner.	m Spicer	F Own	3.92 RL-R
5000	5000	5000	4200c	6300	6500	132	33x5	LaFayette.....	Own.....	8-3 1/2x5 1/2	33.80	Johnson.	Delco.	Delco.	m-d Own.	Own.....	m Own.	F Own	4.58 RL-R
1795	1795	1795	2145d	2345	2345	123	32x4 1/2	Lexington.....23	Anst.....C	6-3 1/2x4 1/2	25.35	Rayfield.	G-D.	Conn.	m-d Own.	Warner.	f Sneed.	F Salis	5.10 RL-T
1575	1395	1575	1575	2345	2245	117	32x4	Liberty.....10-D	Own.....	6-3 1/2x5	23.44	Strom.	Wagner	Wagner	s-p B&B.	Detroit.	m Spicer	1/2 F Tim	4.80 RL-T
3800	3800c	3800	4600c	4400	4900	136	33x5	Lincoln.....	Own.....	8-3 3/4x5	36.45	Strom.	Delco.	Delco.	m-d Own.	Own.....	m Spicer	F Tim	4.58 RL-R
8090	9500c	9600	11750	11750	11600	142	35x5	Locomobile...Series 8	Own.....	6-4 1/2x5 1/2	48.60	Ball&B.	West.	Delco.	m-d Own.	Own.....	m Own.	F Own	3.85 RL-R
3385	3185	3185	3350c	4385	4385	136	32x4 1/2	Marmon.....34	Own.....	6-3 1/2x5 1/2	33.75	Strom.	Delco.	Delco.	m-d Own.	Own.....	m Spicer	3/4 F Own	4.10 RL-R
795	795	p960d	895b	935	1195	109	31x4	Maxwell.....	Own.....	4-3 3/4x4 1/2	21.03	Stewart.	Remy.	Remy.	e Own.	Own.....	f Own.	1/2 F Own	4.60 RL-T
5400	5600	5700	6720	6600c	6810	140	33x5	McFarlan.....1923	Own.....	6-4 1/2x6	48.60	Rayfield.	West.	West.	m-d M&E.	B-L....	m Peters	F Tim	3.75 RL-R
3950b	3950c	3950c	3950c	4850	5250	132	32x4 1/2	Merced.....Series 5	Own.....	4-3 1/2x6 1/2	22.50	Ball&B.	West.	Eisem.	m-d Own.	Own.....	m Spicer	F Own	3.87 TL-R
1295	3750c	3750c	4700	4850	5000	132	32x4 1/2	Merced.....6	Own.....	6-3 1/2x5	33.75	Strom.	West.	Eisem.	m-d Own.	Own.....	m Spicer	3/4 F Own	3.77 TL-R
1295	1295	1495d	1585c	1695	1895	115	31x4	Moore.....U6-40	Cont...6 Y	6-3 1/2x4 1/2	23.44	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer	1/2 F Tim	5.10 RL-T
	1785	1995c	1995f	2585	2485	128	32x4 1/2	Moore.....6-58	Cont...8 R	6-3 1/2x4 1/2	27.34	Strom.	Delco.	Delco.	s-p B&B.	B-L....	m Spicer	1/2 F Tim	5.09 RL-R
1240	1240	1390	1645c	2090	2190	121	33x4	Nash.....691-3-6-7	Own.....	6-3 1/2x5	25.35	Marvel.	Delco.	Delco.	s-p B&B.	Own.....	m Own.	1/2 F Own	4.50 RL-T
915	935	1195d	1445	1445	1725	112	33x4	Nash.....692-4-5-8	Own.....	6-3 1/2x5	25.35	Marvel.	Delco.	Delco.	s-p B&B.	Own.....	m Own.	1/2 F Own	4.90 RL-T
				1275				Nash.....41-8	Own.....	4-3 3/4x5	18.23	Marvel.	Delco.	Delco.	s-p B&B.	Own.....	m Own.	1/2 F Own	4.88 RL-T
2175	2475c	2375	2485d	3250	3285	130	32x4 1/2	National.....BB	Own.....	6-3 1/2x5 1/2	29.40	Rayfield.	West.	Delco.	s-p B&B.	B-L....	m Univ.	F Col.	4.08 RL-R
2500	2500c	2600c	3500	3275	3285	128	33x5	Noma.....4C	Cont...8 R	6-3 3/4x4 1/2	27.34	Zenith.	Delco.	Delco.	s-p B&B.	Detroit.	m Spicer	1/2 F Tim	4.45 RL-R
945	945	1165c	1195	1345	1395	115	32x4	Oakland.....6-44	Own.....	6-2 1/2x4 1/2	18.90	Marvel.	Remy.	Remy.	e Own.	Muncie.	m Mech.	F Own	4.70 RL-R
975	975	1145a	1075c	1395	1595	115	32x4	Oldsmobile...43 A	Own.....	4-3 1/2x5 1/2	21.86	Zenith.	Delco.	Delco.	s-p B&B.	Muncie.	m Own.	3/4 F Own	4.70 RL-R
	1850c	1735	1675c	1875	2025	122	33x4 1/2	Oldsmobile...46	Own.....	8-27 1/2x4 1/2	26.45	Ball&B.	Delco.	Delco.	e Own.	Muncie.	m Spicer	F Own	4.93 RL-R
1625p	1375	1675c	1875	2025	2635	115	32x4	Oldsmobile...47	Own.....	8-27 1/2x4 1/2	26.45	Johnson.	Delco.	Delco.	s-p B&B.	Muncie.	m Own.	3/4 F Own	5.10 RL-R
495	495	395g	750	795	100	100	30x3 1/2	Overland.....91	Own.....	4-3 1/2x4	19.60	Till.	A-L....	A-L....	s-p B&B.	Own.....	m Own.	1/2 F Own	4.50 RL-R
695	695	395g	750	795	100	100	30x3 1/2	Overland.....92	Own.....	4-3 1/2x4	19.60	Till.	A-L....	A-L....	s-p B&B.	Own.....	m Own.	1/2 F Own	4.50 RL-R
2185	2185	2650c	3175c	3275	3350d	126	33x4 1/2	Packard.....126	Own.....	6-3 3/4x5	27.34	Own.	A-K....	Delco.	m-d Own.	Own.....	m Spicer	1/2 F Own	4.66 RL-R
3850	3850	4550c	4550c	3255f	3575	133	33x4 1/2	Packard.....133	Own.....	6-3 3/4x5	27.34	Own.	A-K....	Delco.	m-d Own.	Own.....	m Spicer	1/2 F Own	4.66 RL-R
2695	2450	3850	4550c	4755	4700	136	33x5	Packard "Eight"....136	Own.....	8-3 3/4x5	36.45	Own.	Dyneto.	Delco.	m-d Own.	Own.....	m Spicer	1/2 F Own	4.70 FL-R
2695	2450	3850	4550c	4900f	4950	143	33x5	Packard "Eight"....143	Own.....	8-3 3/4x5	36.45	Own.	Dyneto.	Delco.	m-d Own.	Own.....	m Spicer	1/2 F Own	4.70 FL-R
2695	2450	3850	4550c	4900f	4950	143	33x5	Packard "Eight"....143	Own.....	8-3 3/4x5	36.45	Own.	Dyneto.	Delco.	m-d Own.	Own.....	m Spicer	1/2 F Own	4.70 FL-R
2695	2450	3850	4550c	4900f	4950	143	33x5	Paige.....6-70	Own.....	6-3 3/4x5	33.75	Rayfield.	Remy.	A-K....	m-d Long.	Warner.	m Mech.	1/2 F Tim	1.60 RL-R
1550	1390	1425	1465d	2395f	2395	120	32x4 1/2	Peterson.....23-6-52	Cont...8 R	6-3 3/4x5 1/2	27.34	Strom.	Delco.	Delco.	s-p B&B.	Durston.	m Spicer	1/2 F Salis	4.50 RL-R
2690	2750	2260g	3300	3390	3840	128	33x5	Peerless.....23	Own.....	8-3 1/2x5	33.80	Ball&B.	Delco.	Delco.	s-p B&B.	Own.....	m Spicer	1/2 F Tim	1.90 RL-R
5250	5250	5250	6800	6900	6800	138	33x5	Pierce-Arrow.....	Own.....	6-4 x5 1/2	38.40	Own.	Delco.	Delco.	m-d Own.	Own.....	m Spicer	1/2 F Own	4.29 RL-R
	1695	1745	1745	2445	2495	126	32x4 1/2	Pilot.....6-50	H.S....90	6-3 1/2x5	25.35	Till.	Wagner	Wagner	s-p Hoos.	Muncie.	m Blood.	3/4 F Col.	4.67 RL-R
2535	2535	2585d	2635d	3385	3585	126 1/2	32x4 1/2	Premier.....6-D	Own.....	6-3 3/4x5 1/2	27.34	Strom.	Delco.	Delco.	s-p B&B.	Own.....	m Spicer	1/2 F....	4.58 RL-R
	2850	2900	2850c	3500	3700	124	32x4 1/2	Reo & V Knight...H	Own.....	6-3 1/2x4 1/2	29.40	Rayfield.	A-L....	A-L....	s-p B-L.	B-L....	m Spicer	1/2 F Tim	5.40 RL-R
	1335	1545d	1545d	1885d	2185f	120	32x4	Reo.....76	Own.....	6-3 1/2x4 1/2	24.34	Rayfield.	N.E....	N.E....	s-p B-L.	B-L....	m Own.	1/2 F Own	4.70 RL-R
3200c	3200	3200c	4000	4000	4000	131	32x4 1/2	Revere.....M	Dues....	6-4 1/2x6	30.63	Strom.	West.	Bosch.	m-d B-L.	B-L....	m Spicer	3/4 F Std	3.44 RL-R
1485	1885c	1885c	1885c	1985	1985	117	32x4	Rickenbacker...B	Own.....	6-3 1/2x4 1/2	23.44	Strom.	Bosch.	Bosch.	s-p Own.	Warner.	m Mech.	3/4 F Col.	4.63 RL-T
1635	2035c	2035c	2135	2135	2135	117	32x4	Rickenbacker...B	Own.....	6-3 1/2x4 1/2	23.44	Strom.	Bosch.	Bosch.	s-p Own.	Warner.	m Mech.	3/4 F Col.	4.63 RL-T
2685	2485	2685	2750c	3285	3585	128	32x4 1/2	Roamer.....6-54-E	Cont.12XD	6-3 1/2x5 1/2	29.40	Strom.	West.	Split.	s-p B&B.	G-L....	f Sneed.	1/2 F Tim	4.60 RL-R
	3685	3485	3800	4250f	3950	138	32x4 1/2	Roamer.....6-54-E	Cont.12XD	6-3 1/2x5 1/2	29.40	Strom.	West.	Split.	s-p B&B.	G-L....	f Sneed.	1/2 F Tim	4.60 RL-R
3785	3485	3800	3650c	4250f	3950	138	32x4 1/2	Roamer.....4-75-E	Roach....	4-4 1/2x6	28.90	Strom.	West.	Split.	s-p B-L.	B-L....	f Sneed.	1/2 F Tim	1.06 RL-R
10900	10900	10950	12800	12850	12900	143 1/2	33x5	Rolls-Royce...40-50	Own.....	6-4 1/2x4 1/2	48.60	Own.	Bijur.	Bosch.	e Own.	Own.....	m Own.	F Own	3.70 RL-R
			13500	13500	12900														
			5100	5200	5200	118	32x4	Rubay.....	Own.....	4-2 1/2x5 1/2	12.10	Strom.	Bosch.	Bosch.	s-p Own.	Own.....	m Univ.	F Own	5.10 FL-R
			5250	5250	5250														
1615	1615	2615d	2615	5100	5200	118	33x4	Sayers Six.....DP	Cont...8 R	6-3 3/4x5 1/2	27.34	Strom.	Delco.	Delco.	s-p B&B.	G-L....	m Arvac.	1/2 F Std.	4.75 RL-R
875	875	2500	2500c	3300	3400	127	30x3 1/2	Seneca.....L-2 & O-2	l.yc....KB	4-3 1/2x5	19.60	Zenith.	A-L....	A-L....	s-p B&B.	G-L....	m Univ.	F Peru	1.75 RL-R
985	985	2500	2500c	3300	3400	127	31x4	Seneca.....50c & 51c	l.yc....KB	4-3 1/2x5	21.03	Zenith.	A-L....	A-L....	s-p B&B.	G-L....	m Univ.	F Peru	1.50 RL-R
				3600	3500	127	34x4 1/2	Standard.....99	Own.....	8-3 1/2x5	33.80	Zenith.	West.	Split.	s-p B&B.	G-L....	m Arvac.	1/2 F Tim	4.45 RL-R
2750	2750	2425g	3585	3985	3985	130	32x4 1/2	Stanley.....740	Own.....	2-4 x5	None.	Bijur.	None.	None.	None.	None.	None.	1/2 F Own	1.50 RL-R
319	348	285u	580	645	645	102	30x3 1/2	Star.....	Cont..Spec	4-3 1/2x4 1/2	15.63	Till.	A-L....	A-L....	s-p Own.	Warner.	m Spicer	1/2 F Tim	4.87 RL-R
2250	2250	2450	2275c	3500	3450	125	34x4 1/2	Stearns-Knight..SKL4	Own.....	4-3 3/4x5 1/2	22.50	Rayfield.	A-K....	m-d Own.	Own.....	f Cli.	1/2 F Own	4.50 RL-R	
2700	2700	2850	2700c	3350c	4500f	130	34x4 1/2	Stearns-Knight..6	Own.....	6-3 3/4x5</									





## Each Genuine Part Is Marked

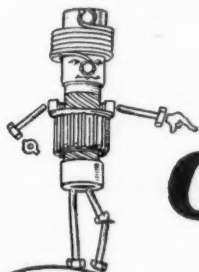
**E**ACH genuine part for The Bendix Drive is plainly marked with the name "Bendix"—for your protection. Genuine springs for The Bendix Drive show a label—all other parts have the name "Bendix" stamped into the surface. Look for it!

Pride, care, experience, knowledge, special equipment, skilled workmanship, and the best material for each purpose—all these result, naturally, in superiority.

And these elements all contribute to the making of each genuine part for The Bendix Drive.

In our experience none but a genuine part will give our standard of satisfactory, dependable service in The Bendix Drive.

**CAUTION:** In our Bendix Drive advertisements, now appearing regularly each month in *The Saturday Evening Post* and *The Literary Digest*, the public is being cautioned to buy none but *genuine* parts and is asked to look for the name "Bendix" on each part.

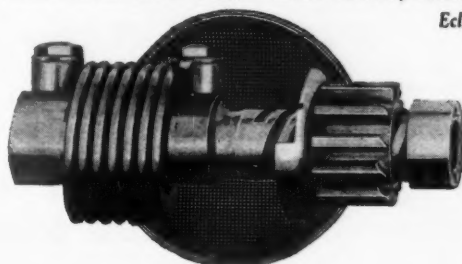


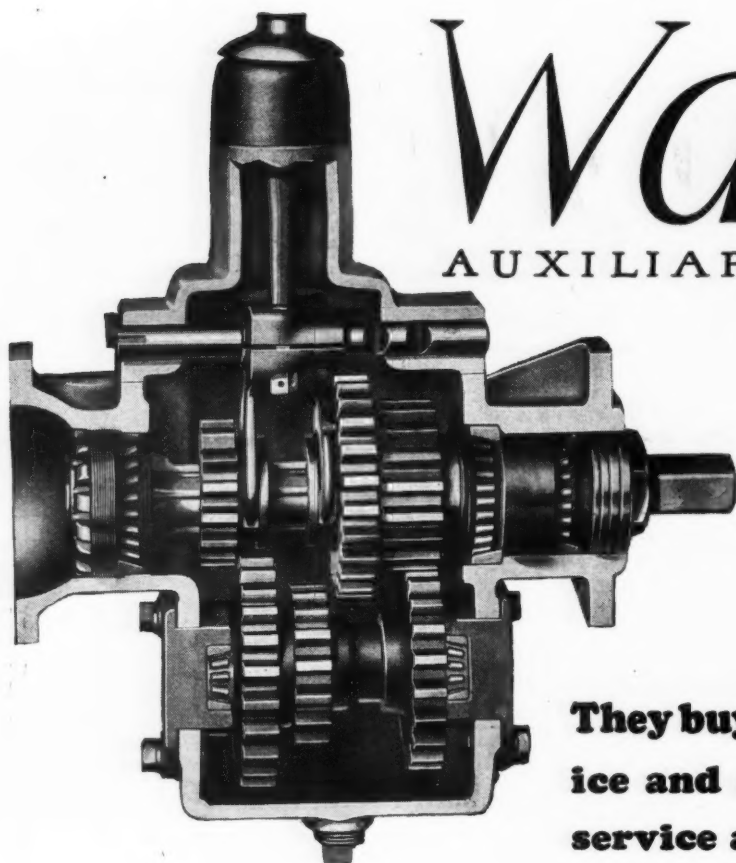
## It pays to sell none but **GENUINE PARTS** FOR **BENDIX** **DRIVE**

ECLIPSE MACHINE CO., ELMIRA, NEW YORK

Detroit Office:  
1342 Book Bldg.

Eclipse Machine Co., Limited  
Walkerville, Ontario





# Warford

## AUXILIARY TRANSMISSION

**Timken Bearings.**  
**3 $\frac{1}{2}$ % nickel steel**  
**gears. Vanadium**  
**shafts. Aluminum**  
**alloy case.**

**They buy the Ford truck for service and economy. But the most service at the greatest economy, requires the Warford selective gear transmission.**

### **Warford Distributors**

AUBURN, N. Y.  
 Foster-Warford Co.

BALTIMORE, Auto  
 Accessory Association  
 26 S. Greene St.

CANTON, Ohio  
 Dine-De Wees Company  
 400 Walnut Ave., S. E.

DALLAS  
 Houdaille-Polk Co.  
 2218 Commerce St.

DAVENPORT, Iowa  
 Sieg Company

DENVER, Motor  
 Specialties Company  
 17 W. 13th Avenue

MEMPHIS  
 Continental Body Co.  
 476 Union Ave.

MINNEAPOLIS  
 McGee White Corporation  
 1311 Hennepin Ave.

NEW YORK  
 Motive Parts Corporation  
 796 10th Ave.

SAN FRANCISCO  
 Warford-Pacific Co.  
 1111 Post Street

STOCKBRIDGE, Mich.  
 Transmission Sales Co.

VANCOUVER, B. C.  
 E. W. Jay

WICHITA, Kans.  
 Price Auto Service Co.  
 301 S. Topeka Ave.

**Warford makes a full-fledged 2-ton truck of the Ford, with six forward speeds. UNDERDRIVE to outpull most 2-ton trucks—OVERDRIVE to make the 2-ton Ford an economical speed wagon running light.**

**Warford increases the low-cost ton-mile margin in favor of the Ford. The added profits of the 2-ton market await Ford dealers. Write for proposition.**

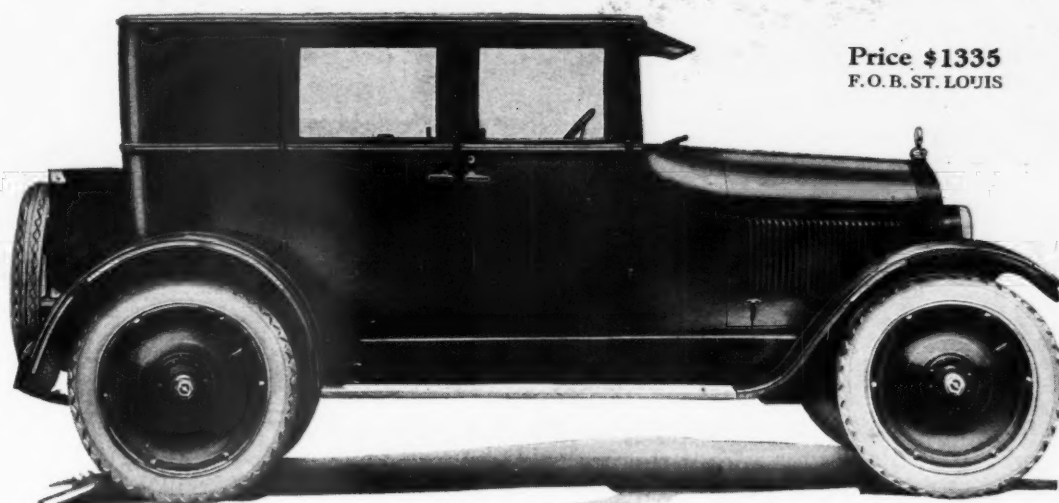
**The Warford Corporation**  
**44 Whitehall Street, New York**



# GARDNER

Motor Car

## A New Model



Price \$1335  
F. O. B. ST. LOUIS

### Three-Door Brougham

**N**OT A COACH—NOT A SEDAN—NOT A COUPE—but the lowest priced three-door, five-passenger closed car made—a Quality job throughout.

A wide, roomy, solid front seat enabling the driver and extra front seat occupant to ride in real comfort—no folding-chair or camp-stool contrivances.

A wide rear door permitting direct and convenient access to rear compartment without disturbing the occupants of the front seat. Three people ride comfortably in the roomy, deeply cushioned rear seat.

*Style—Quality—Comfort—Price  
All Right—and—All There*

A Complete Line of 1924 Gardner Models Now Available  
THE GARDNER MOTOR CO., INC.  
ST. LOUIS

# GARDNER

Motor Car



Tell your Customer that he can have a brand new Fostoria fender for less than repair costs on the old one—and you make more money.

## It's Just as Easy to Sell a New Fender—and far more profitable

**SELL** a new Fostoria fender—don't gamble away your profit and your customer's good will trying to straighten the old fender.

Almost without a single exception it is less expensive to replace with a new Fostoria fender than to hammer out the old one.

And it's far more satisfactory. Your new Fostoria

fender goes on in a jiffy—no long delays to aggravate the car owner. It always looks better than a repair job. Your customer cheerfully pays the bill.

Fostoria fenders for practically all popular cars are carried in stock by Fostoria distributors in all markets.

Write for catalogue.



Fostoria replacement fenders are made for the following cars: Allen, Buick, Cadillac, Chevrolet, Chandler, Cleveland, Dort, Essex, Hupmobile, Jordan, Nash, Oldsmobile, Studebaker, White trucks and Yellow cabs. New makes and models are being constantly added.

The Fostoria  
Pressed  
Steel  
Company

OPEN DEALERSHIPS  
Distributors of Fostoria Fenders are making big profits in constantly increasing volume. Many good territories are still open to dealers and sub-dealers. Yours may be one. Write for our proposition.

Department A  
Fostoria,  
Ohio

### FACTS ABOUT FOSTORIA FENDERS

Made for the Replacement Trade only.

Every Fostoria fender is a new fender, wholly made from the raw materials within our own plant.

Fostoria fenders are inspected after every operation, and when assembled are carefully jigged. Perfect fit is guaranteed.

The beautiful enamel finish is baked on Fostoria fenders in great modern electric ovens.

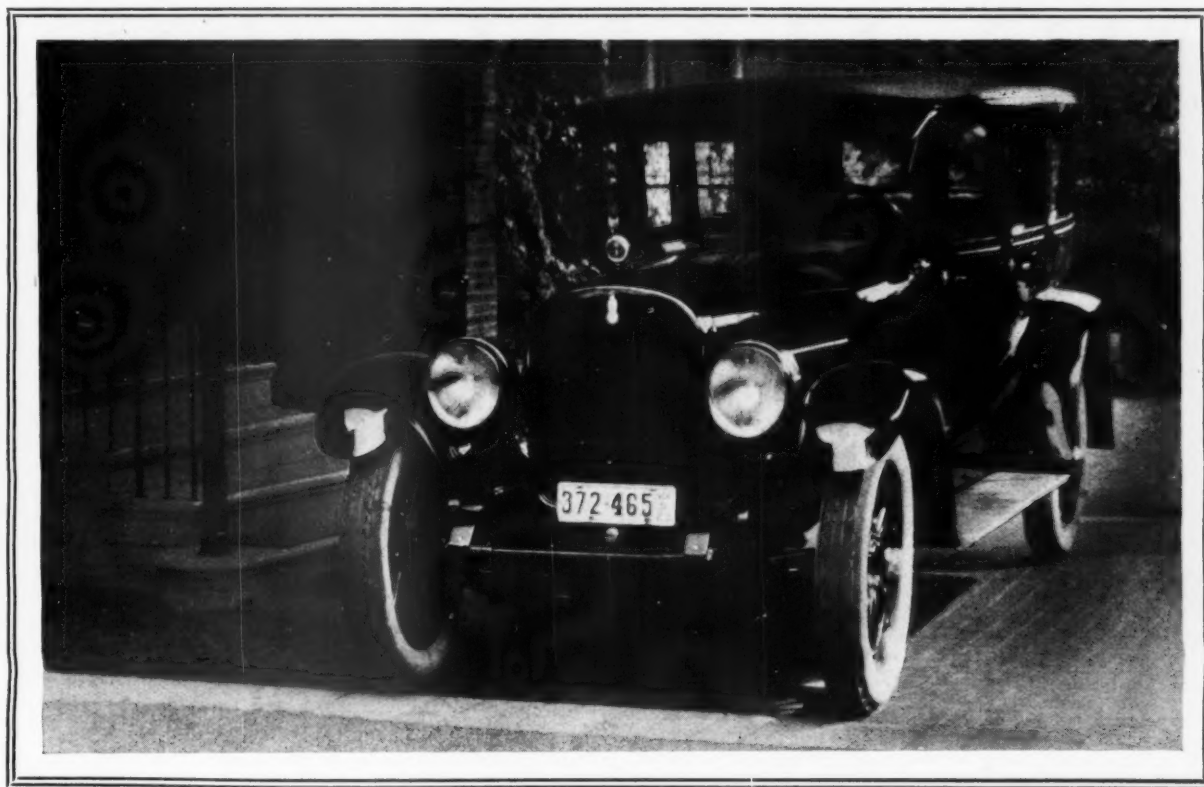
Fostoria fenders weigh as much as or more than the original equipment on the car.

Fostoria fenders are packed for shipment by our own exclusive method which absolutely protects them against damage in transit.



*Replace with*  
**FOSTORIA FENDERS**





## REPUTATION

THE J. I. Case T. M. Company is known in practically every city town and village in the United States. For more than eighty years it has had a splendid reputation for stability, strong financial standing and honorable business practice. Its trademark is world famous.

To motor car distributors and dealers, this is a tremendously valuable asset. "Case" needs no explanation. Confident acceptance has become a habit.

J. I. CASE T. M. COMPANY, Racine, Wis.



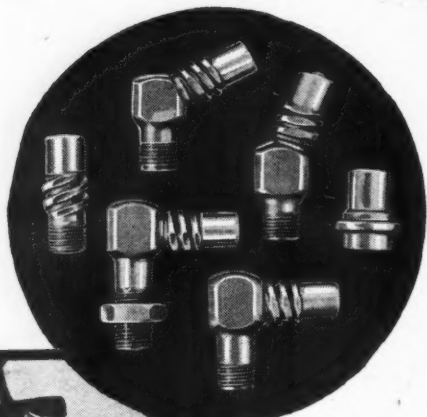
**CASE**  
**MOTOR CARS**



*The Sign of Mechanical Excellence for More than Eighty Years*

# ONE HAND *Does it all!*

**Makes solid, sealed-tight connection, opens valve, forces in grease or oil, closes valve, disconnects gun**



*NIPPLES for the "DOT" system are made in all the various forms necessary for easy, one-hand direct connection at any lubricating point on any chassis. Nipples proper are of one-piece steel. Ball check valve cannot leak. Attractive slotless dust cap snaps on and covers valve and locking thread completely.*

**I**T is plainly evident that the "DOT" is the most ruggedly constructed high-pressure lubricator in the field. But it is more than that. The "DOT" is absolutely a one-hand gun—not only in connecting and disconnecting, but in forcing in grease or oil.

With the "DOT" a man of ordinary strength can, with one hand, apply sufficient pressure to clean out the most obstinate bearing. The 3000 pounds leak-proof pressure possible with the "DOT" far exceeds that of any other gun of its kind.

The "DOT" is the *original* gun employing the direct connection principle. And this connection is not only direct, but *solid*. A slight twist to the right and the sturdy, case-hardened steel nozzle of the "DOT" locks solidly onto the steel nipple and automatically opens the valve.

A turn to the left disconnects gun and closes valve—keeping the gun under compression and ready for the next operation. This positive valve action saves time and energy and permits the use of oil as well as grease.

The "DOT" is by all odds the **STURDIEST, HANDIEST, MOST PRACTICAL** and **MOST POWERFUL** high-pressure lubricating system made. In two years it has been adopted as standard equipment on seventy cars and trucks.

**CARR FASTENER COMPANY, Boston 39, Mass.**

*Makers of the "DOT" line of fasteners*

Branch Offices—40 Selden Ave., Detroit  
47 W. 34th St., New York

**CARR FASTENER CO. OF CANADA, LIMITED**  
HAMILTON, ONTARIO



ONE HUNDRED leading jobbers and  
TWO THOUSAND dealers sell the  
"DOT." Send for descriptive folder.

*The*

# DOT

TRADE MARK

# high pressure LUBRICATOR



**“You  
Can’t  
Laugh  
This  
Off”**

**—either!**

**AKRON, O.**

"The Stutz Six motor functions properly, develops good power and wonderful speed. Was attracted to the Stutz by its general appearance and its performance on the road. Am getting about 16 miles per gallon of gas." A. S. LAMNECK  
34 Grand Ave.

**ALTOONA, PA.**

"I am more than pleased with the performance of my Stutz Six Sedan. The word pleased is too mild to express my appreciation of the best performing car I have ever had the pleasure of owning." C. B. KEARNEY, 1016½ Green Ave.

**ANDERSON, IND.**

"The Stutz Six is beautiful, runs smooth as a boat, extravagantly upholstered, economical in gasoline consumption, has all the speed needed and attracts universal attention. I am proud to be the owner of this car." THOS. N. STILWELL, 824 Main St.

**ATHENS, GA.**

"The faster you go the better the Stutz Six rides. My mileage is about 18 miles per gallon around town. It is the best doctor's car I have seen. I am delighted with it." DR. A. B. PATTON

**ATLANTA, GA.**

"I did not purchase the Stutz Six until I had made an exhaustive study of all cars that might be considered in its class. After this study I purchased the Stutz Six because I was convinced that it was the best value on the market today. It far exceeds my expectations. It is certainly built right." GEO. P. HAWES, Jr., Major, Q. M. C.

**BALTIMORE, MD.**

"I find the performance of the Stutz Six excellent. Am getting around 16 miles to the gallon of gasoline." THOS. R. PEED, 2504 Roslyn Ave.

**BELLEVILLE, N. J.**

"I am thoroughly satisfied with my Stutz Six Roadster. Plenty of go, easy and comfortable riding qualities, and from experience so far, know the upkeep will be very low. I have been satisfied with two previous Stutz cars." GEORGE E. GOODMAN  
Hanlon & Goodman Co.

**BENTON HARBOR, MICH.**

"Every mile that we have driven our Stutz Six has been a mile of pleasure. It is a very responsive car, picks up quickly in traffic and has power which takes the hills without shifting gears." C. A. BEEBE

**BETHLEHEM, PA.**

"I bought a Stutz Six because of my belief that I was getting more for my money than with any other car that I know of; secondly, because of its great ease of operation and flexibility; and thirdly, because it is economical both in oil and gasoline as well as in repairs." GEORGE R. BOOTH  
Main and Market Sts.

**BOSTON, MASS.**

"Want to congratulate you on the wonderful qualities of my Stutz Six Sedan. Am averaging 20 miles to the gallon of gasoline. The riding qualities are as comfortable as any car I have ever had. I have never had to shift gears except in starting on any road in the states I have been in. I have made as high as 70 miles an hour and less than 5 in traffic. I have driven many cars in the past 15 years but am better suited with my present Stutz than any car I have owned." CHAS. H. ROSSKAM  
939 Tremont Bldg.

**CHICAGO, ILL.**

"My new Stutz Six has proved very satisfactory and is all that I expected it to be." O. C. DOERING  
Sears, Roebuck & Co.

**CINCINNATI, O.**

"It is a pleasure for me to write you in regard to my Stutz Six. Indeed, I have great confidence in your new product. It is a pleasure for me to drive and I will be more than glad to recommend it." H. F. MANN, Hotel Sinton

**CLEVELAND, O.**

"My Stutz roadster is very satisfactory. Have driven it 5000 miles and would not trade it for any car I know. The touring car purchased for my son is a wonder. We have been driving cars for 19 years, have driven high grade cars of several makes, but expect totie to the Stutz in the future." T. B. VAN DORN, Pres.  
The Van Dorn Iron Works Company

**COEBURN, VA.**

"I have thoroughly tested out the Stutz Six and am highly pleased with it. I would have no hesitancy in recommending this car to any of my friends." J. F. FORD

**COLUMBUS, O.**

"The Stutz Six takes the hills beautifully. Am getting around 15 miles to the gallon of gas and from appearances it doesn't use oil! I like its performance better than any car I have had since 1919 and that includes a \$5000 car and two —'s (priced several hundred dollars higher than the Stutz)." ALMINA H. CONVERSE

**CUYAHOGA FALLS, O.**

"The Stutz Six has everything one could ask of a car and I like it better every day I operate it." W. H. STILLWELL, Pres.  
The Eclat Rubber Co.

**DAVIS, ILL.**

"I am well pleased with the Stutz Six. It handles easy and is the best 'puller' that I ever drove. It is a very easy riding car. It has more speed than I will ever use. It is a well built car." J. BLACKMORE

**DENVER, COLO.**

"The performance of the Stutz Six is beyond any question of doubt the most satisfactory of any car I have ever driven. It has worlds of power, it is easy to handle and rides as comfortably as any car on four wheels." JACK PAYMENT  
1634 Broadway

**DUBUQUE, IOWA**

"I want you to know how much I appreciate my Stutz Six. I am confident it is going to exceed my expectations, and I feel very proud of it. It is so much easier to handle than other cars I have owned." MRS. MYRTLE R. KELLER

**DUCKABUSH, WASH.**

"I have owned and operated a number of standard makes of cars—all splendid machines—but for comfort, flexibility of engine, perfect control in difficult situations, endurance, ease of operating, and economy in gas mileage, the Stutz Six is far superior for an all-around car to any machine of my experience or observation." ALFRED M. HUBBARD

**DULUTH, MINN.**

"Words cannot express my satisfaction with my Stutz Six. Am more than pleased with it. Only sorry I could not have had one long ago. Nobody can explain what a Stutz Six is. They have to drive one to find out. It is a wonder." C. J. GILLIES  
183 E. Boulevard, Morgan Park

**EUCLID, O.**

"The Stutz Six surpasses all our expectations. It is a wonderful car in every respect. With the lightest touch on the accelerator she fairly flies. Would not trade our Stutz Six for any other car we have ever owned. Get more than 15 miles per gallon of gas." MRS. MADELEINE H. MOYER

**GLOUCESTER CITY, N. J.**

"I am very well pleased with my Stutz Six Sedan. The motor never fails to respond. It is economical on fuel—about 15 miles to the gallon. The car has less vibration than any car I have had." EDWARD J. O'HARA  
100 North Broadway

**HAMMOND, IND.**

"I want to assure you that I am very well pleased with my Stutz and hope that it continues to perform in the way that it has to date." W. R. BEATTY  
Beatty Machine & Mfg. Co.

**HARRISON, N. Y.**

"The oiling system is as fine as can be installed in any car. As to hill-climbing the Stutz Six has no equal. Its powerful motor makes speed changing unnecessary. The body cannot be improved on. The Sedan is most comfortable for touring." JOHN F. LANGE

**HOQUIAM, WASH.**

"The Stutz Six Sedan attracted me on account of its compact body and its ability to hold the road under adverse conditions. Have owned and driven a number of other makes of cars but I like the Stutz Six the best of all. I make about 16 miles to the gallon over country roads. Considering the weight of the car and the power of the engine think this is remarkable." R. W. CRAIG, 311 Eighth St.

**INDIANAPOLIS, IND.**

"I wish to go on record as a highly pleased Stutz owner, having lately purchased a Stutz Six Sedan, it being the twelfth car I have owned. To me it has all the qualities of a perfect motor car—correct size body, comfortable, easy riding, a wonderful motor of surprising flexibility, and with reserve power in abundance. Never before have I been so well pleased with any purchase." F. E. GATES, Gates Manufacturing Co.

**JAMAICA PLAINS, MASS.**

"I am glad to have an opportunity of telling you how pleased we are with our Stutz Six Sedan. Our expectations have been more than realized. Get more than 15 miles to the gallon in spite of heavy loads and long hills. The ease with which the car can be handled in traffic and the general ability and stylish appearance should make it a big seller." F. W. VORCK

**JAMESTOWN, N. Y.**

"There can be no question as to the individuality and efficiency of a motor that handles a car with so much ease as the Stutz Six. The pickup, quick getaway, speed and ease with which this motor dominates the road, places the car in a class out of the ordinary. I have been able to get better than 15 miles to the gallon maintaining 40 miles an hour." EDWARD E. DUFFIE, 20 W. Third St.

**KALAMAZOO, MICH.**

"I am very greatly impressed with the performance of my Stutz Six Roadster. It operates so easily in every way—responds so quickly to the slightest touch—it is certainly a thoroughbred." MRS. WINIFRED KNIGHT  
132 E. South St.



**LOUISVILLE, KY.**

"We want to express our appreciation of a real motor car—the Stutz Six. It has more power, speed and comfort than any car I have ever driven. We looked over a number of cars, most of them higher priced than the Stutz, and we liked the Stutz Six better than any of them."

C. S. RADFORD, Kentucky Parfay Co.

**MANSFIELD, O.**

"I have never driven a car that has the power, pep and getaway that my Stutz Six has. To say that I am pleased is putting it mildly. I am getting about 16 miles on the gallon and no addition of oil except after draining the crankcase—which I have never experienced with any other car I have had."

W. G. SCHWAN, The Schwan Studio

**METAMORA, ILL.**

"The Stutz Six Sedan I purchased is giving excellent satisfaction. It has the pep."

I. C. SNYDER

**NASHVILLE, TENN.**

"The Stutz Six is a real car and I like it better every day. It is so easy to handle that my wife likes it as well. I have owned several cars but none to compete with the Stutz Six. I think it the best car for the price."

W. H. KING, 4311 Nevada Ave.

**NEWTON CENTER, MASS.**

"The Stutz Six Sedan I recently purchased is the fifth Stutz I have owned. As a sea-going man would say, 'It's as handy as a pocket in a shirt.'"

W. McMILAN  
Senior Capt. of Pilots, Boston Harbor

**NEW YORK, N. Y.**

"The Stutz Six Sedan delivered to me has from day to day become more and more a pet. It rides like a rocking chair both in the front and rear seats. The motor is amazingly flexible for one which has such a wealth of power."

H. W. SCHAEFER

H. W. Schaefer Co., 25 Broadway

**NORTHEAST HARBOR, ME.**

"Our Stutz Six has now been driven eighteen hundred miles, and has given perfect satisfaction and goes up any of our bad hills without changing gears. It's quite a satisfaction to know when we start out to go anywhere we can get there without calling on a garage man with engine trouble."

MRS. LYDIA V. GRAVES

**PHILADELPHIA, PA.**

"The Stutz Six Sedan has proven very satisfactory. We have given up the ——— (car selling for over \$3000) for the Stutz and Mrs. Royer, who also drives, and myself, are certainly gratified with the wonderful performance of the Stutz Six."

E. H. ROYER,

Pres. Vance Realty Co.  
1112 Chestnut St.

**PIPER CITY, ILL.**

"Am more than well pleased with my new Stutz Six. There is no hill too steep or no mud too deep for the Stutz to go through. Nothing can make the Stutz Six back up. I am satisfied."

K. B. HAWTHORN

**PITTSBURGH, PA.**

"The Stutz Six is very easily handled—the ease of shifting gears is very marked. The riding qualities, too, are pleasing, and as for power, the way the car gets over the hills is a delight."

JOHN M. RONEY

Vanadium Metals Company

**PORTLAND, ORE.**

"Have owned a number of cars the past 18 years, but have never owned one or ridden in one that surpassed the Stutz Six for all-around motor car ability."

FRANK E. WATKINS, 252 Stark St.

**PORT NORRIS, N. J.**

"My Stutz Six is all that I could expect of a car. The car's performance is in every way remarkable. I have always heard the Stutz spoken of as a good car and the Stutz Company as a reliable concern."

DAVID ROBBINS, Sr.

**PROVIDENCE, R. I.**

"Have just returned from a 1275-mile trip to Canada in my new Stutz Six Sedan. I averaged 18 miles per gallon and one gallon of oil was more than needed. Took every hill on high, including the famous Lebanon Hill between Pittsfield and Albany, going over top of this hill at 35 miles per hour."

H. L. FINKLE, 95 Fountain St.

**RAPIDAN, VA.**

"Gasoline consumption averages about 17 or 18 miles. I am highly pleased with the new Stutz Six Sedan."

R. M. BRADY, Horseshoe Farm

**RED WING, MINN.**

"We are more than pleased with the performance of our Stutz Six. Plenty of speed, power and easy riding. I have owned and driven four other makes of cars, so should be a fairly good judge."

PAUL EAMES

**SEATTLE, WASH.**

"As to the performance of my Stutz Six would say, very good. Comparatively, it has more power than any other car within \$700 of the same price. The word 'Stutz' has always meant power and speed. All other things being equal, a purchaser of a motor car wants this to be included. The power feature alone is what finally closed the deal. There are two disadvantages that most closed cars have not overcome and that is most of them are top-heavy and do not have the extra power that is required for the extra load. These have been overcome in your Stutz Six Sedan."

C. V. GRAY

Gray Lumber & Shingle Co.

**SILVER CREEK P. O., PA.**

"I have owned and driven a lot of cars in the past 20 years, ranging in price from five hundred to five thousand dollars. I believe that the Stutz Six is worth the price if any of them are—ample power—easy riding—and will roll over any ordinary road at a speed from 45 to more than 60 miles an hour, very nicely."

DAN SLATTERY

**SOMERVILLE, MASS.**

"The Stutz Six is a thoroughbred. Easiest riding car my wife ever rode in. Is steady, hugs the road—ordinary roads it makes a boulevard. It is built like a battleship. I can't find a weak spot in it. Clutch very smooth; engine quiet; just as silent at top speed as at 35 miles an hour. No vibration."

CHARLES R. HOLMES

265 Beacon Street

**SPRINGFIELD, ILL.**

"The riding qualities of my Stutz Six are superb and the gas consumption averages about 18 miles per gallon. The pickup and hill climbing ability are so superior to my fondest hopes that I find the car to be the best I have ever driven."

DR. DON DEAL, Deal Clinic

**SPRINGFIELD, O.**

"Having just completed a 2300-mile trip to the White Mountains and Eastern Coast I feel that I am in position to give you facts concerning the Stutz Six. The car made 70 miles per hour with no vibration. It was no strain to run 350 to 400 miles per day. Oil consumption practically nothing."

A. B. DAVIS

**ST. LOUIS, MO.**

"The Stutz Six has wonderful pickup. It ranks with the highest class automobiles of today and the refined and artistic finish throughout places it in first rank."

WM. REIMANN, Vice-President  
South Side Trust Co.

**ST. PAUL, MINN.**

"Up to the present time I am thoroughly satisfied with my Stutz Six. The car is operating beautifully."

ROY A. BALSEY, 315 Capitol Bldg.

**TACOMA, WASH.**

"My recent purchase of a Stutz Six Sedan from your Tacoma representative has caused me to receive many flattering expressions complimenting me on the judgment shown in its purchase. I have driven the car about 1200 miles and as near as I can determine, I am getting some fourteen to eighteen miles on a gallon of gasoline. I am fully convinced that it is a wonderful car—in fact I class it as a 'thoroughbred.'"

L. W. FIELD

Tidewater Crossarm & Conduit Co.

**TOLEDO, O.**

"I made a test on gas—filled the tank up, drove to Detroit, Mich., around the city traffic and came back to Toledo. The speedometer showed 159 miles and found I had used 9 gallons of gas when I filled the tank again. Average 17.6 miles per gallon, and there were four full-grown people in the car. We are well pleased."

DALE H. DURBIN, 2410 Erie St.

**TUNNELTON, W. VA.**

"I am more than pleased with my Stutz Six. My family think it great. I have people stop me in nearby towns to look the car over and express the belief that it is a fine car."

W. H. PENTONY

**WASHINGTON, D. C.**

"I am glad I had the opportunity of purchasing another Stutz car, as the former Stutz which I had gave exceedingly good satisfaction, and I was always much pleased with it."

E. A. DIETRICH, Pres.  
J. B. Mosby & Co.

**WHEELING, W. VA.**

"I am covering from 18 to 20 miles to the gallon of gasoline. The performance of the Stutz Six and its ease of handling are all that I had expected and my anticipations of the speed, power and stamina have been fully met."

W. H. TRUSHEL, Jr.

**WILLIAMSBURG, PA.**

"—Delighted. Aside from its riding qualities, which give a delightful sensation of comfort, there is no six-cylinder car on the road today that can exceed it in either power or speed. It is very economical in gas and oil. Will climb steep grades with an ease I never experienced with any former car whether my own or in which I have ridden."

J. E. LANG

**ZANESVILLE, O.**

"I find my Stutz Six very easy to handle in all places. The gasoline mileage is very good."

MRS. PEARL H. RAILE  
364 Congress Ave.



The Sign of the Genuine

# STUTZ SIX

## \$1995 to \$2550

*Exclusive of Freight and Tax*

## Now Is the Time to Grow With the Stutz

There is no gainsaying the success of the Stutz Six. The mass of evidence from all parts of the country found on the foregoing pages represents only a small percentage of the testimonials received from individuals who *know* the car as a result of actual experience with it.

No dealer, in determining on the line of cars he is to sell, can afford to overlook the significance of such complete owner satisfaction. Nor can any foresighted merchant fail to be impressed with what it means to him to be

assured such extraordinary good will in the conduct of his business.

The Stutz is in the ascendancy. Sales are increasing steadily month by month. Backed by the vast resources and financial stability of its makers, the Stutz Six is a car with a real future—one with which the dealer can build permanently.

Now is the time to make a connection that will enable you to grow with Stutz and provide for the future—soundly, safely and with exceeding profit.

**STUTZ MOTOR CAR COMPANY of AMERICA, Inc., Indianapolis, Indiana**

*Builders of the Original and Genuine Stutz Motor Cars*

Stutz Motor Car Company of America, Inc.  
Indianapolis, Indiana.

Gentlemen:—

I am interested in obtaining information regarding the Stutz franchise for the territory designated below.

Cars Now Handled: \_\_\_\_\_

Signed \_\_\_\_\_ Firm Name \_\_\_\_\_

Address \_\_\_\_\_

By \_\_\_\_\_

Territory desired: \_\_\_\_\_

## WIRE

**for particulars concerning your territory or**

**←Use the Coupon**

**Act Now—Your territory may still be unassigned**



# ROBERTSON

## Radiator Shutter



### Positive Control

Operates from Driver's seat

Can't get out of order

Adds to Appearance of Your Car

Prevents Radiator Freezing

Makes Easy Starting and Greater Motor Efficiency

Increases Gas Mileage

Saves Battery

Prevents Repair Bills and laying up the car

### A Big Help With Next Winter's Overhead

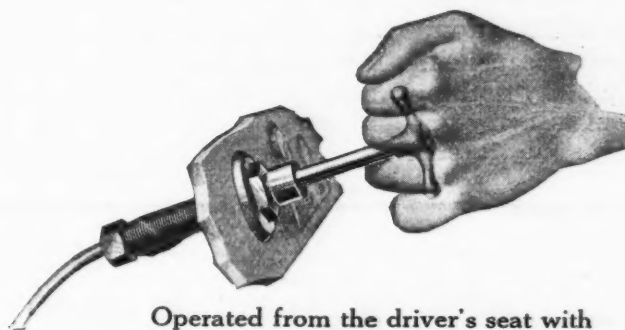
Winter used to mean that a certain amount of the summer's profits had to be set aside to carry running expenses along through the slack months of snow.

But the wise automotive retailers nowadays are keeping all their summer profits, and making winter sales carry winter overhead. They are pushing seasonable items—and pushing them hard.

They are buying in moderate amounts, asking customers to buy, and clearing their shelves in a week or two. They are carrying their more general, less seasonable stocks without cost.

Here you are offered an article that fits perfectly into that efficient scheme. It is a winter necessity of moderate price, very attractive, and highly profitable.

Get into line with the fellows who make money the year round. Ask now for details and discounts.



Operated from the driver's seat with the Cooper Dash Control which locks at any position by a slight twist of the wrist.

De Luxe, for large radiators.....	\$16.00
Standard, for medium size radiators .....	15.00
Chevrolet Special, for Chevrolets .....	15.00
Ford Special, for Ford Cars.....	13.50

Manufactured by  
**ROBERTSON MFG. CO.**  
28 So. 10th St., Minneapolis, Minn.

Sales Representatives  
**DAVIS-PALMER CO.**  
4750 Sheridan Road, Chicago, Ill.

What's  
your name  
worth?



Every tire you sell carries *your* business reputation. If it doesn't give the service which the car owner expects, it will weaken his confidence in your judgment. If it is ever hawked around at cut prices, your store will be cheapened in the car owner's opinion. If you do not buy the highest character of tire, you cannot hope to hold the highest character of trade—the *most profitable, too*—because it repeats.

The reason why so many experienced tire dealers have turned to the General Cord is that time has proved that they can give it the sanction of their own names *fearlessly*. No matter how hard the competition, its quality has never been cheapened. Its reputation for reliability and long mileage has grown greater each year—and sales have naturally done the same.

In advertising, the General Cord has constantly maintained an even dignity, reflecting the quality of the product. Without exaggeration, without sudden outbursts and consequent silence—it has steadily impressed the public with the real character of a fine tire.

General's dealers have *really* represented the General factory. The relationship has been founded on sound principles—the men in the General's organization were once tire dealers themselves.

From every angle, the General Cord stands worthy of your name—not only for its past performance—but because that record is your best assurance of its future performance. Write today for our Class "A" Dealer's proposition.

# THE GENERAL CORD TIRE



THE GENERAL TIRE AND RUBBER COMPANY  
AKRON, OHIO, U. S. A.



# Good Driving Is Mostly NICE STEERING

HOW TO PARK—HOW TO DRIVE—HOW TO ENJOY YOUR MOTOR CAR MORE

THIS ARTICLE (Continued on next 2 pages) SHOULD BE KEPT FOR REFERENCE



HE suggestions for the driving of motor cars and motor trucks presented here are not intended to be absolute or final. It is understood that exigencies arise around which no rules can be laid; on the other hand, the applications of the few simple principles outlined here, in ordinary driving, will better fit the driver to meet the emergency situations as they arise.

ATTENTION TO THE JOB IN HAND is first and most important. The good driver is never careless.

TREATING YOUR GUEST IN YOUR CAR AS YOU WOULD IN YOUR HOME is the first point of driving etiquette. It is not only discourteous, but illegal, to risk lives.

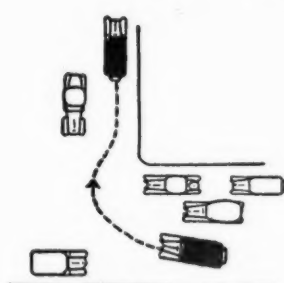
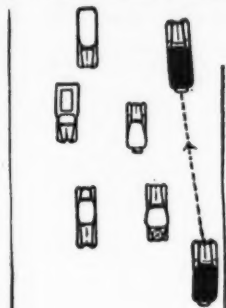
In interpreting some of the instructions and suggestions the divergence of State Laws must be considered.

## City Driving

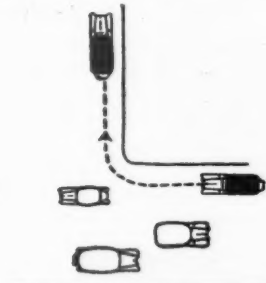
Avoid sharp turns, either to right or left. When moving out from curb, do so in a gradual, diagonal line. When swinging in to curb, do so slowly and gradually.

Tell the driver behind as much as possible by the use of left-arm signals.

Do not depend upon his following your instructions. Your signal does not give you the right to turn in front of him.



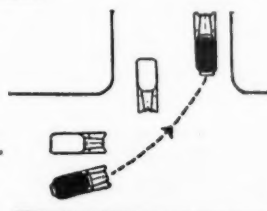
Incorrect method of turning right



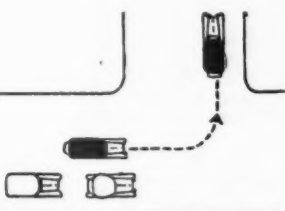
Correct method of turning right

When turning to right at street intersections get as close to right curb as possible before turning.

When turning to left at street intersection get into extreme left lane of traffic.



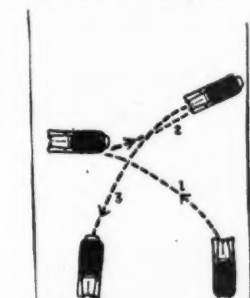
Incorrect method of turning left



Correct method of turning left

When approaching a street intersection, the "Nice-Steerer" slows down to a speed from which he can stop quickly.

In turning around in a street where there is much traffic three movements are necessary. In streets where there is little or no traffic, the "Nice-Steerer" can easily turn in two movements by following the method shown in the diagram:



Turning around in three movements



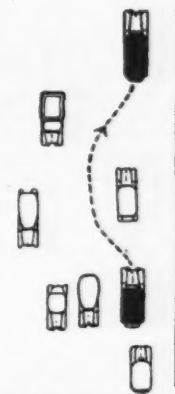
Turning around in two movements

The "Nice-Steerer" never cuts in quickly after passing another machine. He realizes that the other car is moving also, and he allows ample time before gradually getting back to his place on the right of the road.

The traffic lanes near the center of the street are for "through" traffic; that is, cars that are not contemplating turning off to the right at the next several streets. The right-hand lanes are for slow, or parking, or right-turning traffic.

The "Nice-Steerer" remembers that the rear wheels do not "track" the front wheels in turning. He allows ample, but not too much, leeway for the rear wheels to miss curbs, posts, guards, traffic signals, building corners, etc.

As a rule it will be found a time and trouble saver to "turn about" by driving around the block rather than jamming traffic by turning in the street. (This is not allowed, anyway, in many communities.)



It is safest to turn out to pass immediately after a car has gone by in the other direction. Then you are sure no one behind is passing you.

MOTORISTS, motor clubs, truck operators, garages, automotive manufacturers and dealers, insurance companies, police chiefs, and other public officials not only in the United States and Canada, but in Europe and elsewhere, have so far absorbed 1,784,392 copies of the booklet, "Good Driving Is Mostly Nice Steering."\* 17,842 letters of commendation have been received. And the method of distribution has been through receipt of actual requests.

Nothing better indicates the deep and widespread interest in good driving, which is mostly nicety of steering.

It is plain how largely nice steering, so greatly in demand, depends upon ease of turning the front wheels.

Wherefore an ever-increasing number of manufacturers use Timken Tapered Roller Bearings in the steering pivots.

In steering pivots, as in transmissions, and on differentials, and on pinions, and on worms, and in rear wheels, and in front wheels, Timken dominance results from Timken extreme load capacity and ruggedness, and from Timken adjustability for the wear that must follow motion.

\*These pages are reprinted from the 12th edition of the copyrighted booklet, which will be sent on request, made to the Timken Roller Bearing Co., Canton, Ohio

## TIMKEN

Tapered

## ROLLER BEARINGS

Another opportunity for "Nice-Steering" presents itself minutely in avoiding bumps, ruts, track-crossings, etc. The steering wheel should not be moved too quickly; the reaction is difficult to compensate for; and it imperils all neighboring cars. So long as both front wheels, or both rear wheels, do not hit the obstacle at the same time, the results are not bad.

Street car tracks are at all times, but particularly in wet weather, dangerous to negotiate. If the "Nice-Steerer" finds himself in the tracks he flips his wheels first to one side, then quickly to the other, and thereby scrapes the tires as little as possible, while maintaining complete control of the vehicle.

## Wet Streets

On wet streets the careful driver is even more careful.

Skidding, once started, is hard to stop. Turning the wheels in the direction of the skid will help. But this is dangerous inasmuch as usually there are cars, or children, or curbs, in the way.

THE ONLY SKID THAT YOU CAN CONTROL ABSOLUTELY IS THE ONE THAT DOESN'T START!

(Continued on Page

## GOOD DRIVING IS MOSTLY NICE STEERING—(Continued from Page 71)

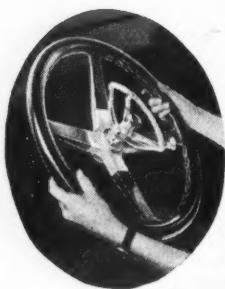
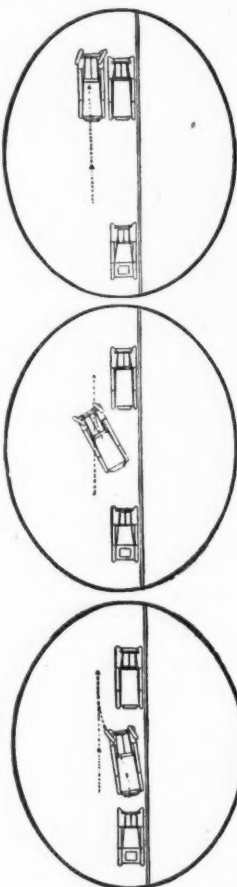
Slow, even turns; slow, even stops; slow, even starts will avoid skids.  
Do not disengage your clutch!  
Tire chains are of assistance on wet or muddy roads.  
Clear vision, obtained by windshield wipers, is also essential.

### Can You Park?

An easily learned method of proper parking in a limited space is to stop parallel to the curb alongside of the car behind which you are going to park, about one foot outside of it; turn the front wheels sharply to the curb and

back slowly until you can see that by swinging the front wheels hard over to the left, your right front fender will just clear the left rear fender of car ahead; turn wheels fully to the left and

back to proper position at curb. This method, once you know positions at which extreme turns are to be made, will park you at the proper distance from curb and other cars in one backward movement.



### Country Driving

While the "Nice-Steerer" keeps constantly on the alert even while driving through little-trafficked roads, the first thing to be learned for comfortable touring or long-distance driving is a safe method of relaxation.

Authorities agree that the safest and sanest grip on the wheel is one hand above the other one palm up, the other down. (See illustration.) This grip provides the greatest leverage on the wheel with the least exertion. And all of the necessary exponents of safe driving—hand brake, horn, throttle, etc., are within easy reach.

The intermittent use of the hand throttle, on good, open roads, will rest the right foot and leg. The occasional use of the hand brake, besides being an excellent method of conserving both brakes, is also expedient and safe.

At no time should both hands be free of the wheel. Small stones, ruts, and bumps will quickly disturb the equilibrium and throw the car in the ditch.

Do not stop (to repair tires, etc.) in the middle of the road, near curves, or near the crest of hills.

Stones should be removed from the road after using them to block the wheels.

### Starting the Motor

The spark should be retarded.

The clutch should be disengaged so that the battery need not uselessly turn over the transmission gears.

It is often easier to start the motor by turning it over several times, with the air choked, before turning on the switch.



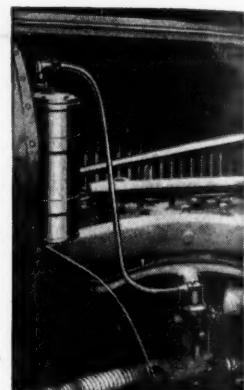
### Gasoline Line and Carburetor

Dirt in the gasoline line—and there will be dirt despite the most careful filling—should be forced out by air.

Dirt or water in the vacuum tank may be removed through the cap-screw at the bottom.

Dirt or water in the float chamber of the carburetor may be cleaned out by removing the screen container and blowing out both the container and screen.

The petcock at the bottom of the carburetor should be opened frequently to permit the accumulated water to run out.



### Cooling System

Keep the radiator well filled. Use soft water, if you can get it.

The radiator should be completely drained and flushed at intervals of about once a month.

The fan belt should be tight to prevent slipping, but not too tight for easy running.

In the mounting of the fan, Timken Tapered Roller Bearings assure the same attentionless service that they give in the more severe service points of the motor vehicle. For lubrication of fan see general lubrication chart in this article.

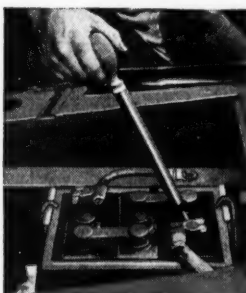


### Steering Apparatus

The steering apparatus requires little attention, but should be inspected frequently to make sure that the front wheels are in line and that there is no play in either the wheels, the tie-rod, or remainder of the gearing.

Tires should be kept properly inflated. (See table of tire pressures in this article.)

And above all, the best assurance of easy steering is to own a machine, the steering pivots of which are mounted on Timken Tapered Roller Bearings. In such machines the steering mechanisms—instead of scraping and grinding—turn easily on the rollers of Timken Bearings.



### Battery

At least once in two weeks, and oftener in hot weather, the battery should be inspected to see that distilled water covers the plates in each cell by  $\frac{1}{2}$  inch.

If the hydrometer shows a reading of less than 1250, the battery should be recharged. A reading of 1280 means that the battery is fully charged.

Dry the top of the battery after filling. Keep terminals clean. An application of vaseline aids in preventing corrosion.

### Spark Plugs

Clean, heavy-hitting spark plugs delight the "Nice-Steerer."

Plugs can best be cleaned by soaking in kerosene and scraping with a dull knife.

The points of the spark plug should be set apart about the thickness of a worn dime.

### Lights

Both head and tail lights should be inspected before starting out.

It is a good plan to carry an extra head-light bulb, tail-light bulb, and fuse, for lights may burn out any time.

To avoid danger to yourself, as well as other machines, your lights should be focused so that they do not throw their rays above four feet from the ground at any point.

The "Nice-Steerer" uses his dimmers when meeting other machines, for many lenses that are legal throw a blinding glare when the bright lights are on.

(Continued on Page 73)





# GOOD DRIVING IS MOSTLY NICE STEERING— (Continued from Page 72)

## Tire Pressure

The "Nice-Steerer" checks the air in his tires every week. Tires should carry:

Tire Diameter	Pressure
3½ inches	60 pounds
4 inches	70 pounds
4½ inches	80 pounds
5 inches	90 pounds

Cord tires may be run somewhat softer, according to tire men, without excessive injury.

The spare tire should be protected from the weather.

Wheel alignment front and rear should be checked regularly.

Inspect tires frequently and fill up holes and cuts with tire filler.



## Tire Chains

If properly applied, chains are less harmful to the tire.

The hooks, when laying the chain over the top of the tire, should be toward the rear.

The chains should be just tight enough to allow them to creep on the tires.

## Insurance

Because not all drivers are "Nice-Steerers," and if you are contemplating buying automobile insurance, be sure you are covered before taking the car out of the garage. Not only may "tomorrow" be too late—it never arrives.



## If You Have Never Driven a Car

This is the way to start your car after starting your motor:

- (1) Disengage your clutch, put the gear-shift lever in low (first) speed position, and engage the clutch slowly as you depress the accelerator.
- (2) After the car has gained some momentum disengage the clutch, move the gear-shift lever from low (first) to intermediate (second) speed and engage the clutch gradually, as you slowly depress the accelerator.
- (3) When the momentum is between 15 to 20 miles an hour disengage the clutch. Move the gear-shift lever from intermediate (second) speed into high (third) speed. Engage the clutch. (This does not apply to cars with planetary type transmissions.)

## Maintenance of Timken Bearings

The greatest advantage of Timken Tapered Roller Bearings is the adjustable feature or "take-up," as it is commonly called.

Many different methods are used in mounting Timken Tapered Roller Bearings in front and rear wheels, differential, pinion, and transmission of various types of vehicles. In any case the adjustment is easily made. All that is required is a half turn of a nut, removal of a shim, or the screwing up of a carrier that holds the cup. This moves the cone and roller assembly and cup closer together.

**WHEEL BEARINGS.** To take up the wear on wheel bearings is a simple matter. Draw up the nut on the end of the spindle until the wheel binds. Next revolve wheel to be sure all working surfaces are in contact. Then back off nut from one-third to one-half of a turn to a point where wheel is free running. At the same time see that there is no "play" when the wheel is shaken. Lock the adjusting nut at this point.

Do not mistake wear on steering pivot bolts or bushings for play in wheel bearings.

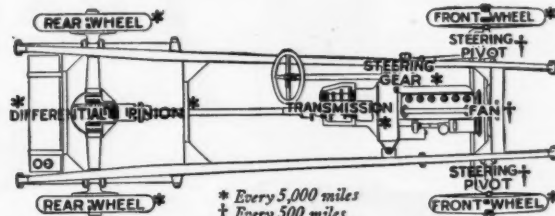
**NUT OR SCREW ADJUSTMENT.** To take up the wear at rear axle and transmission, where screw or nut adjustment is provided, the nut or screw should be drawn up to a point where it starts to bind. It should then be backed off from one-third to one-half a turn and locked at that point.

**SHIM ADJUSTMENTS.** To take up wear where shim adjustments are provided, remove the bolts that hold the carrier in place. Take out one of the thinnest shims. This is usually all that is required. Next put bolts back in place.

**WORM SHAFT ADJUSTMENT.** The following instructions should be observed on adjustment of worm shaft bearings on 1, 1½, 2, 2½, 3, and 3½ ton trucks.

The worm shaft should be so adjusted as to make allowance for expansion from heat generated in service. On most trucks the adjustment is taken up on the front end of the worm housing by screwing on a sleeve which forces the cup farther over the cone and roller assembly. One notch on this sleeve equals about .005".

Adjustments should be made on various trucks as follows: On 1, 1½, 2, 2½ ton; screw the sleeve in until the end play is out of the worm shaft. Back off two or three notches which equals .010" to .015" end play. On 3 and 3½ ton trucks; screw the adjustment in until all end play is out of the worm shaft. Back off 4 to 5 notches, which equals .020" to .025" end play. The reason for this end play is, as noted above, to take care of expansion of worm shaft.



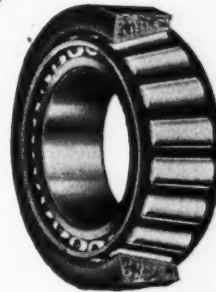
These are the points at which Timken Bearings are used in automobiles. Each of these points should have attention (either inspection, lubrication, or adjustment) at the mileages indicated.

**LUBRICATION OF BEARINGS.** Any light grease or heavy oil will serve as a lubricant for Timken Roller Bearings, if it is positively free from acid. The lubricant should be placed in the grease cups, where they are provided.

In the case of wheel bearings, the lubricant should be spread with a paddle. It is advisable not only to spread it on the cage holding the rollers, but also fill the hub. This may appear like too much grease. Any apparent excess, however, will be taken up by the parts as soon as they are in operation.

The greatest care must be exercised to see that there is absolutely no grit on the paddle, in the grease, or on the bearings themselves.

Should the presence of grit be detected, wash the bearings thoroughly with gasoline and dry them, after which the lubricating should be done over again.



THE basic design of Timken Tapered Roller Bearings is inherently adapted for Dual-Duty—the ability to carry not only radial loads, but all thrust loads, and resultant loads at all speeds.

This simplifies mountings, permits smaller and lighter housings and thus inaugurates an entire series of refinements and economies which have been a major influence in evolving motor cars of such high value as those of today.

# TIMKEN Tapered ROLLER BEARINGS

## You will Know a "Nice-Steerer" by

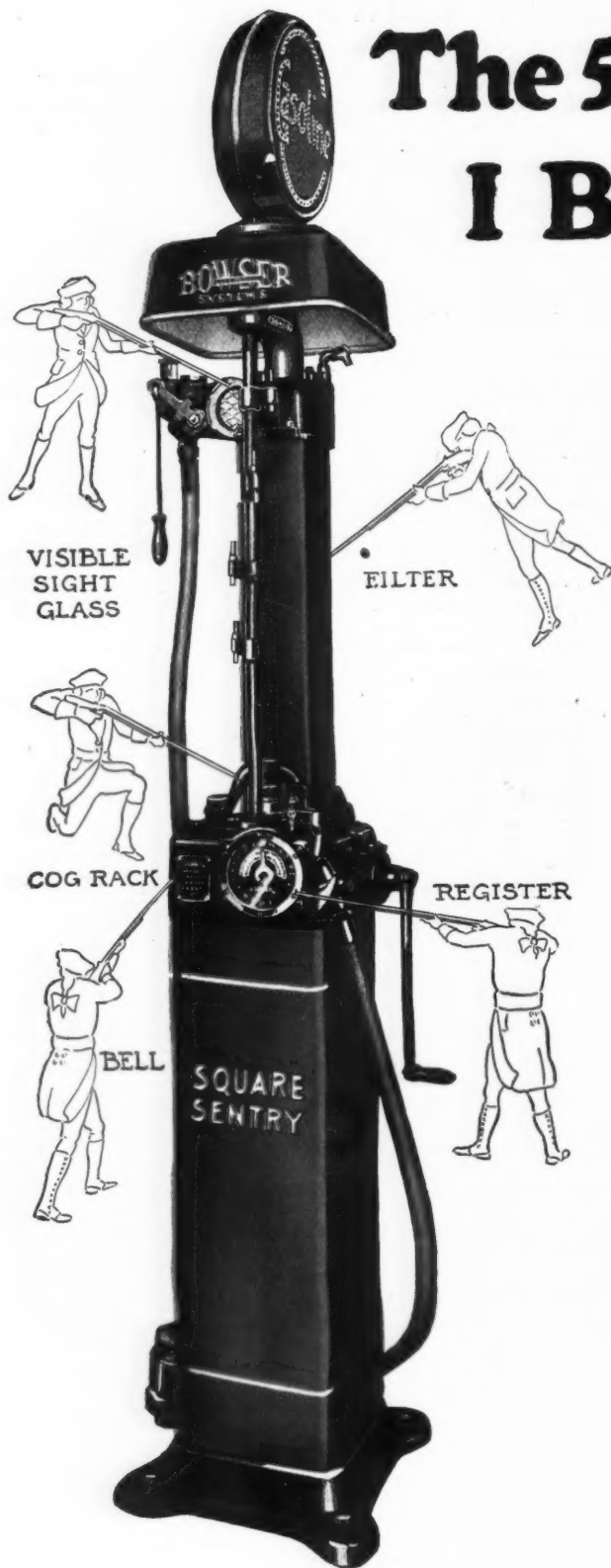
- His keeping to the right of the road, particularly on curves and over the crests of hills.
- His extensive and intelligent use of arm signals.
- His avoidance of all obstacles, however small, without endangering the occupants of his car or any other car.
- His ease of handling.
- His strict obedience of every traffic regulation.
- His respect for "No Parking" signs.
- His courteousness in hugging the right of the road when you blow your request to be let by.
- His protection of his motor; his use of second and first speeds.
- His alternate use of foot and hand brakes on long grades or in emergencies.
- His never coasting (he always retains absolute control).
- His thoughtfulness of pedestrians; he thinks for them.
- His respect for railway crossings; he stops, looks, and shifts gears BEFORE he is actually on the tracks.
- His realization that though the Manhattan Limited may be five minutes late, it still has "divine" right-of-way at the blind crossing.
- His consideration of others by keeping his muffler closed in cities and towns.
- His further consideration of others by ringing the door-bell instead of blowing his horn repeatedly.
- His properly adjusted steering apparatus.
- His slowing down at street intersections.
- His use of the brakes BEFORE he gets to the curve.
- His realization that, having seen the child, he (not the child) is responsible.
- His "Nice-Steering."

These suggestions, enlarged and ramified, have been incorporated in a readable booklet, "Good Driving Is Mostly Nice Steering," which will be sent upon request. The Timken Roller Bearing Co, Canton, Ohio.

© 1923, By The T R B Co, Canton, O

# The 5 Money-Makers I Built for You

By S.F. Bowser



These five advantages on my Square Sentry Pump I call "money-makers" because they will make money for you. The artist has helped me emphasize them by having our famous Bowser Sentry—a figure I first used in 1911—point them out:

**First**, there's the visible bull's eye sight-glass—no other pump has that. It shows your customers that the pump is full when pumping starts.

**Second**, there's the easy-running cut-steel cog rack, assuring fast and smooth service, as well as long life.

**Third**, there's the big register that your customer can see and check the measure—its middle name is accuracy.

**Fourth**, there's the bell that rings with every gallon pumped—a feature that alone will bring customers back—they like to hear the bell ring.

**Fifth**, there's the famous Bowser filter—takes every bit of moisture and dirt out of the gasoline as it is served.

These five "money-makers", along with the fine looks the Square Sentry has, assure you more new trade, more repeat trade, more satisfied trade. I want every filling station man in this country to know this pump better.

Address me personally, so your letter will come direct to my desk, and we will tell you how this pump will make you more money. Ask for folder A14.



**S.F. BOWSER & COMPANY, Inc.**  
FORT WAYNE, INDIANA.

*Sales and Service Offices and Representatives Everywhere*



## Two Rings of Proven Superiority



### The Beveled Edge Oil Groove Ring With the Longer Life

**FORCED LUBRICATION** is the answer. The beveled edge collects the oil on upstroke, and increasing compression gradually forces this oil into the inner groove, where it is safely held at the top of stroke, preventing its entering combustion chamber.

On the downstroke the oil is again distributed on the cylinder walls, and forms an oil-seal between the groove and cylinder, effectively preventing compression leakage and providing perfect lubrication.

This action **MUST** happen. It is positive, forced lubrication, with least chance of carbon formation.

*Furnished in either ground or turned finish*

### A "Hy-Grade" Ring at a Reasonable Price

The **UNIVERSAL "Hy-Grade" Plain Ring** is a splendid Quality Ring, yet low in price. Made of the best material obtainable, with a carefully peened interior circumference, the **UNIVERSAL "Hy-Grade"** Ring has been used with unfailing success for years, and where a low-priced dependable ring is desired, is without a superior.

Its lower price tends to make it popular and dealers are selling it in increasing quantities.

*Furnished in either ground or turned finish*

**UNIVERSAL MACHINE CO.**

Baltimore

Maryland



**DEALERS:** Identify yourself with Universal rings. They have proved their superiority and are backed by ample advertising and sales help. Write today for our attractive **JOB BERS'** proposition.

# UNIVERSAL

## PISTON RING



HERE is only one way of making sure of tomorrow's success TODAY — and that is by tying up with an organization and a product of recognized leadership.

DURANT MOTORS is one of the largest and strongest producers in the industry. There are still some mighty good openings for merchandisers of DURANT and STAR CARS.

**DURANT MOTORS, Inc.**

General Sales Department

Long Island City

New York



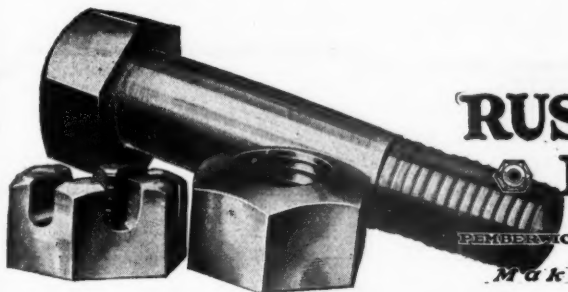


SAMUEL RIKER  
Started December 25, 1872  
**50 Years**  
With Russell, Burdsall & Ward



A Significant Fact  
The "more-than-thirty-years" honor roll at the Russell, Burdsall & Ward plants now contains 82 names

SKILLED labor cannot achieve its best when constantly changing employment. The men who make EMPIRE bolts are not migratory—they are conspicuously happy at their task: explaining why they are conspicuously better at it.



**RUSSELL, BURDSALL & WARD**  
**BOLT & NUT COMPANY**  
PORT CHESTER, N.Y.  
DENVILLE, CONN. • CHICAGO • SAN FRANCISCO • ROCK FALLS, ILL.  
*Makers of Bolts, Nuts and Rivets Since 1845*

# EMPIRE BOLTS

# "Cleans all the



TRADE MARK  
**WAYCROSS**  
 REGISTERED

## DISTRIBUTORS

Hawthorne Brothers.....	Boston, Mass.
Ryan & Hughes, Inc.....	New York City
Alemite Lubricator Co. of Central New York.....	Buffalo, N. Y.
Ross Walton Company.....	Philadelphia, Pa.
The United Parts Co.....	Cleveland, Ohio
George F. Ball Sales Co.....	Detroit, Mich.
Automotive Specialty Co.....	Chicago, Ill.
Western Motor Supply Co.....	Milwaukee, Wis.
P. & J. Sales Co.....	Minneapolis, Minn.
Price Hollister Co.....	St. Louis, Mo.
Price Hollister Co.....	Kansas City, Mo.
Capital Electric Co.....	Salt Lake City, Utah
Pacific Automotive Service Co.....	San Francisco, Cal.
Kennedy & Kennedy.....	Toronto, Ont.

*Will anybody be content with  
the old style peek-hole cleaner*



# e way a cross"



## AT LAST!

Clear vision in every direction—to the right—to the left—as well as in front.

Not just a semi-circular peek-hole in front of the driver alone, but a full unrestricted view of the vehicles, pedestrians, traffic officers, direction signs, intersecting streets and everything—for all occupants of the car.

The WAYCROSS, as the name implies, makes a clean sweep all the way across—left to right—right to left—automatically, continuously—and with force enough to keep the windshield clear of the heaviest snow, sleet, rain or mist.

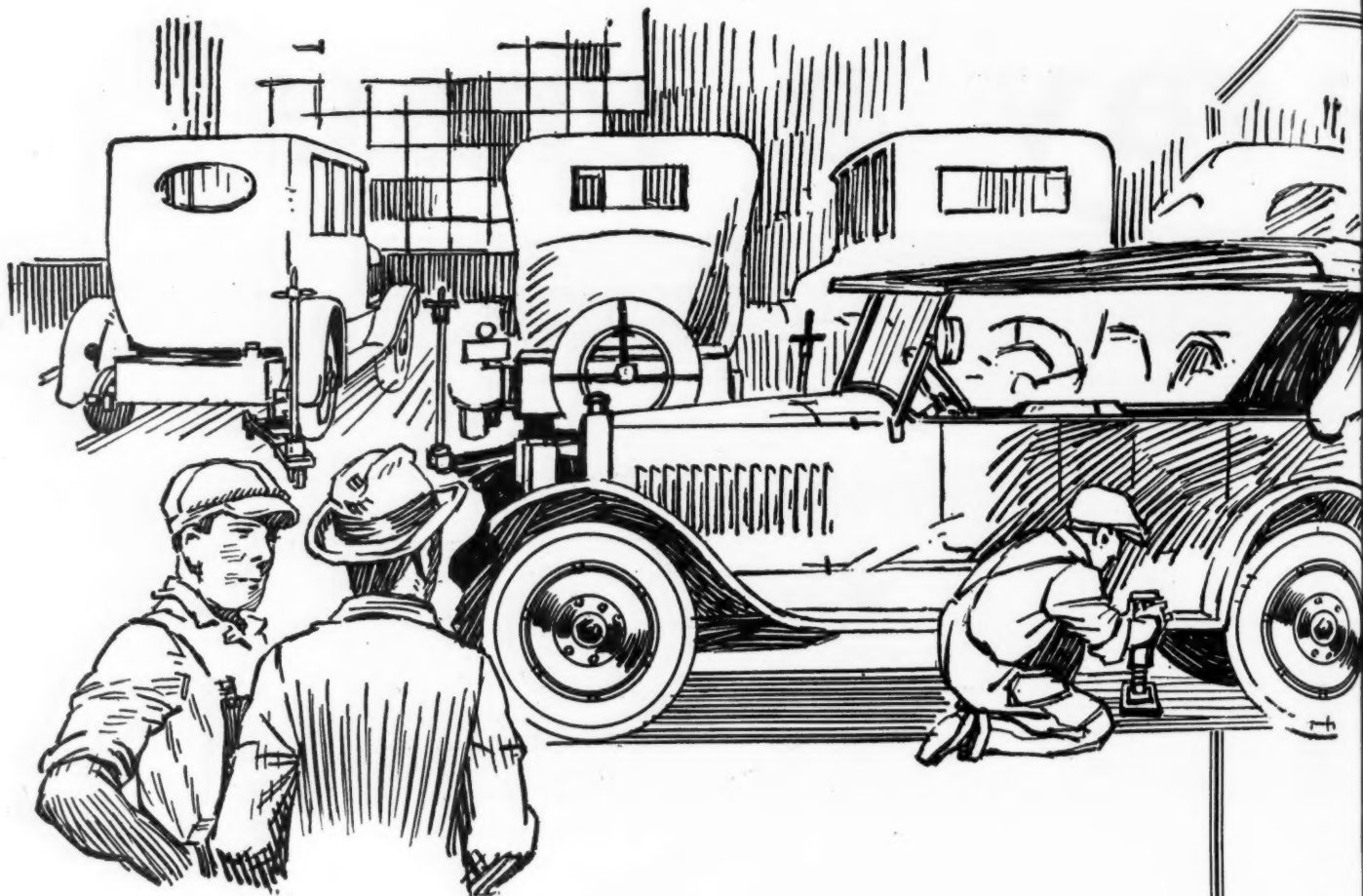
Simple, noiseless, dependable. The most practical accessory since tire chains, and just as essential for safe driving in bad weather. Costs nothing to run. Operated by the vacuum of the motor.

Installed in a few minutes on any car. Price \$10.00.

Get in touch with our nearest distributor.

**ALL CLEAR WINDSHIELDS, Inc.**

FALL RIVER, MASS.



## “Hey, Harry!”

called Tom Morgan, beckoning to his foreman. “What would you do if you caught Jim, the store-room boy, dumping part of our stock of piston rings into the trash barrel?”

“You know darn well what I’d do, Tom; I’d send for a doctor and have his head examined.”

“Well, then, don’t forget that we are selling more labor than we are piston rings. There’s Gus over there trying to jack up a car with an ordinary tool kit jack. He’s been fussing around with it for two or three minutes already and still at it.”

The foreman called Gus over and asked him why he didn’t use a dolly jack, calling his attention to the time he was wasting. Gus had a good alibi, however, because they only had three dolly jacks and these were all in use under cars.

“You’d better get a couple more dolly jacks, then, Harry,” said Tom.

“All right, if you say so,” said Harry, “but dolly jacks cost from \$25 to \$35 apiece and I’ve been

trying to get along without buying any more.”

“Well, Harry,” said Tom, “I appreciate your looking after my interests, but I see this same thing being done pretty nearly every day and when you add up the time that we lose in a year it would pay for a couple dolly jacks and in addition to that don’t forget that I’ll spend \$50 or \$60 or more than that any day to avoid the possibility of an accident. You know that a tool kit jack isn’t a safe proposition. It isn’t built to hold a car up with a couple of mechanics working around it, and even though we are covered by Indemnity Insurance, I’d spend a good deal more than the cost of a couple of dolly jacks to avoid the possibility of any of the boys getting hurt.

“As a matter of fact, though, from a cold, hard business standpoint, we will pay for two extra dolly jacks in time saved inside of a year anyway, and after that our saving will be a clear profit.”

**“The Best Equipped Shop Gets the Business.”**

**SFA**



# Names Every Shopman Should Know

ANY of the manufacturers listed below will help you in the selection of equipment best suited to conditions in your shop without obligating you in any way.

## Mid-West Manufacturing Co. Minneapolis, Minn.

Red Devil Dolly Jacks  
Tire Changing Jacks  
Adjustable Garage Horses  
Garage Cranes and Ambulances  
Burnishing Machines and  
Burnishing Compounds

## T. R. Almond Mfg. Co. Ashburnham, Mass.

Drill Chucks  
Lathe Chucks  
Micrometers, Outside  
Micrometers, Inside, for  
Cylinder Measurements

## Wright Mfg. Co. Lisbon, Ohio

Wright High-Speed Chain  
Hoists  
Standard Screw Chain Hoists  
Differential Chain Hoists  
Steel Trolleys for Overhead  
Track Systems  
Hand Traveling Cranes

## Weidenhoff Products 4352-58 W. Roosevelt Rd. Chicago, Ill.

Electrical Testing Devices  
Test Benches  
Battery Dischargers  
Growlers  
Magnetizers  
Variable Speed Motors  
Generating Holding Vises and  
Driving Chucks  
Mica Undercutters

## The Manley Mfg. Co. York, Pa.

Cranes—Wrecking and Floor  
Presses—Garage and Arbor  
Auto Hoists, Garage Lights  
Garage and Service Jacks  
Towing Trucks  
Engine and Axle Stands  
Portable Benches  
Portable Tool Trays  
Air and Water Stations  
Truck Wheel Handler  
Chassis Underworker

## Van Norman Machine Tool Co. Springfield, Mass.

Valve Grinding Machines  
Piston Grinding Machines  
Milling Machines  
Internal Grinders  
Ball-Raceway Grinders  
Bench Lathes

## Frank Mossberg Company Lamb St. Attleboro, Mass.

*Wrenchsmiths for 20  
Years*

Solid Socket Wrenches  
"Tee" Handles  
Speeders, "Swivel Joint"  
"Tee" Handles and Speeders  
Special Wrenches and Tools  
for Fords  
Miscellaneous Automobile  
Tools  
Socket Wrench Sets and  
Accessories  
Engineers' Wrenches  
Adjustable Wrenches  
Metal Stampings

## Bonney Forge & Tool Works Allentown, Pa.

Original Chrome-Vanadium  
Drop Forged Wrenches  
Original Chrome-Vanadium  
Valve Tappet Wrenches  
Carbon Steel Drop Forged  
Wrenches of all kinds  
Stillson Pipe Wrenches  
Adjustable Wrenches  
Combination Wrenches  
Garage and Small Vises  
Battery and Grease Cup Pliers  
Body Iron Assortments  
Special Automobile Tools  
Drop Forgings

## Continental Auto Parts Company Columbus, Ind.

Motor Overhauling, Radiator  
and Axle Stands  
Piston Vises, Gear Pullers  
Creepers  
Wrecking Trucks  
Straightening Presses  
Piston Aligning Devices  
Burning-in Machines

## The Burton-Rogers Company 755 Boylston Street Boston, Mass.

Hoyt Electrical Instruments  
Ammeters  
Volt Meters  
Rotary Meters  
Growler Sets  
Magnet Testers  
Cadmium Meters  
Cell Meters  
Mohawk Rectifiers

## Weaver Mfg. Co. Springfield, Ill.

Auto Hoists, Axle Stands  
Arbor Presses, Jacks  
Ambulances  
Tire Changers  
Tire Spreaders  
Wire Wheel Repair Stands  
Bucket Pumps  
Gasoline Cans

## Stevens & Company 375 Broadway New York

*Stevens "SPEED-UP"  
Tools*

Piston Aligner  
Microgauge  
Piston Vise  
Valve Reseaters and Refacers  
90 Special Tools for Ford and  
Fordson  
Sectional Cabinets

## The Black & Decker Mfg. Co. Baltimore, Md.

Portable Electric Drills  
Electric Air Compressors  
Electric Portable and Bench  
Grinders  
Electric Valve Grinders  
Bench Drill Stands

## Brunner Mfg. Co. Utica, N. Y.

Air Compressors  
Air Tanks  
Air Hose  
Air Valves  
Automatic Pressure  
Controllers

## Kellogg Manufacturing Company Rochester, N. Y.

Kellogg Electric Motor Driven  
Garage Compressors  
Kellogg Air Towers  
Kellogg Valves  
Kellogg Gauges

## The Jacobs Mfg. Co. Hartford, Conn.

Drill Chucks

## Oxweld Acetylene Co. Newark, Chicago, San Francisco

Oxy-Acetylene Apparatus and  
Supplies  
Ever-Ready Welding, Cutting  
and Lead-Burning Outfits



*"The Best-Equipped Shop  
Gets the Business"*

This advertisement is published and paid for by the concerns listed above who are pioneers in the development of time and labor-saving equipment for automotive service work.

These concerns are co-operating with all automotive service men, and you are cordially invited to write to any of them for information and advice regarding the class of equipment shown below their names.

# SERVICE EQUIPMENT ASSOCIATES

# We contribute

**30,000,000**  
advertisements blanketing the market

remember the slogan -  
*Any motor will run better with a  
Pines Automatic Winterfront*  
**free** - Dealer Helps and  
Sales Suggestions.

**Use the coupon - Do it now!**

*Any Motor Will Run Better With a*  
PINES AUTOMATIC

## WINTERFRONT

TRADE MARK REG. U.S. PAT. OFF.

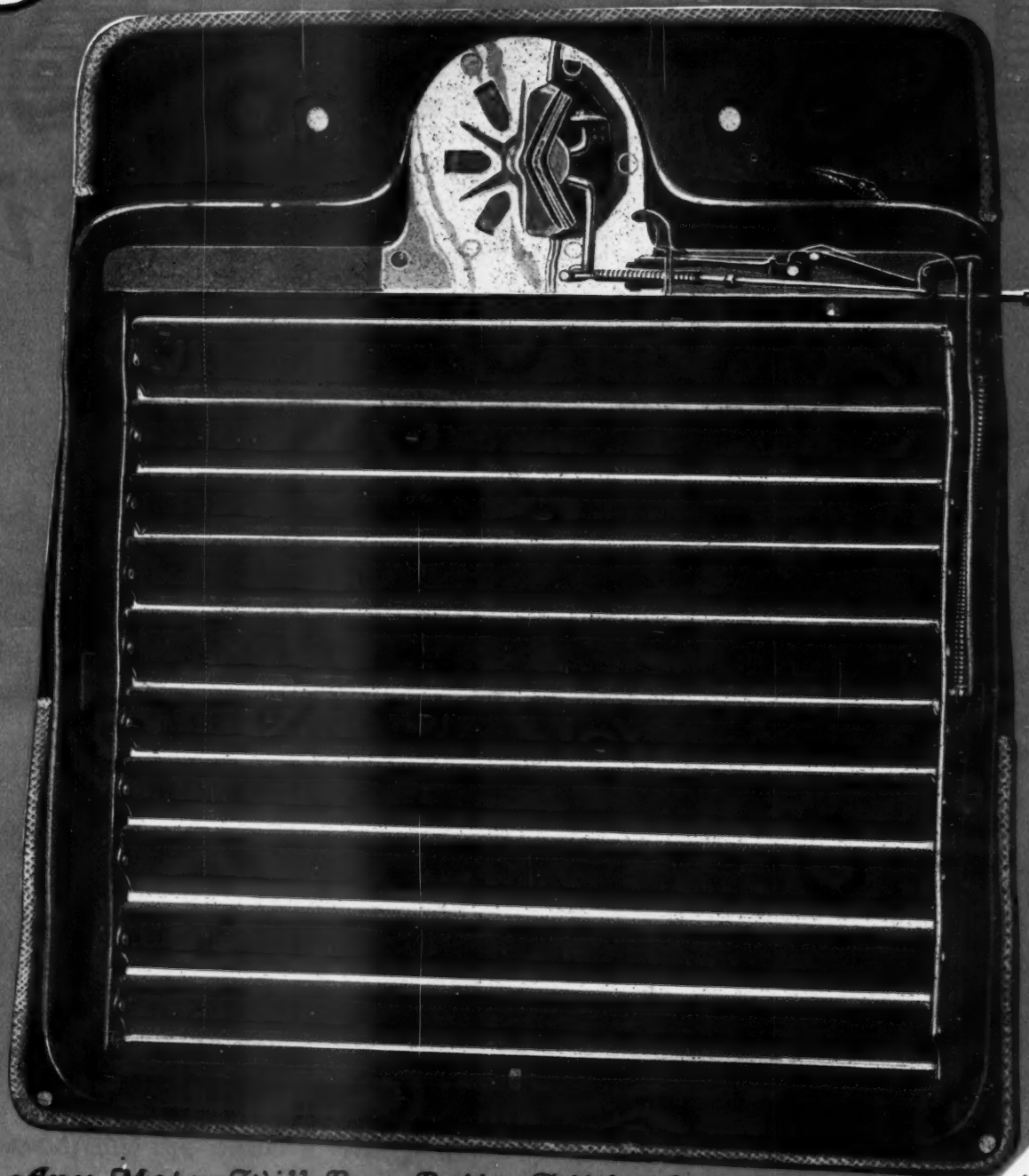
Winterfront is furnished for practically every  
make of car.

It can be put on by anyone in a few minutes  
and shows the Dealer a very satisfactory profit.

**PINES MANUFACTURING CO.**  
404 N. Sacramento Blvd. Chicago, Ill.



# You collect -



Any Motor Will Run Better With A  
PINES AUTOMATIC

## WINTERFRONT

TRADE MARK REG. U.S. PAT. OFF.

Service Stations in distributing centers enable  
Dealers to get quick delivery and render prompt  
service. Ask for Distributor in your territory.

Pines Mfg. Co., 404 N. Sacramento Blvd., Chicago  
Gentlemen: Please give us more information  
about your campaign advertised in Motor  
Age and name of Distributor in our terri-  
tory.  
Name \_\_\_\_\_ Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
Car tag handle \_\_\_\_\_

# REPU

## *Yellow Chassis Trucks*

We have seven Republics, the oldest a 1917 model, and still running strong. These trucks are subjected to hard usage and we must admit at times seriously overloaded.

We are well satisfied with their work, which is evidenced by our purchase of five new Republics during the last three years. We find them very economical of operation and up-keep, and your service and care of us very commendable.

*Oakland Pioneer Soda Water Co.  
Oakland, Calif.*

BOTTLERS  
USE THEM

PACKERS  
USE THEM



OILMEN  
USE THEM

DRUGGISTS  
USE THEM

WHOLESALE  
USE THEM

DAIRIES  
USE THEM

RETAILERS  
USE THEM

COALMEN  
USE THEM



# REPUBLIC

NEWSPAPERS  
USE THEM

DEPARTMENT STORES  
USE THEM

POST OFFICE  
USES THEM

## How Broad Is the Market?

BANKS  
USE  
THEM

Out of all the business activity in your territory, how much of it can logically be considered a possible market for the truck you sell?

Looking at it in this way, many shrewd truck merchants have discovered how Republic trucks take the limitations out of truck selling.

Every business house which can possibly use trucks can use the Republic. There are five capacities to suit every type of haulage, from the sensational Rapid Transit swift delivery type to the big 4-ton Republic unit.

Supporting the dealer's selling efforts on any hauling problem are the successful records of hundreds or thousands of Republics profitably doing the same type of work. For Republic, with more trucks in use than any other exclusive truck

maker, has thoroughly met the test, *with great numbers of trucks*, in every branch of industry, in every kind of territory, under all conceivable conditions.

Only a truck with real national distribution — remember, Republic is one of the very few of these — can focus the prestige of nationwide triumph upon each dealer territory.

Now Republic is sweeping to ever greater eminence. The latest motor and chassis betterments enhance Republic value; today's virile organization embodies the sound experience of Republic personnel; the company's position has never been so strong.

Point for point, a more valuable truck selling privilege does not exist today. Your territory may be unassigned. Why not inquire?

REPUBLIC MOTOR TRUCK CO., INC., ALMA, MICHIGAN  
*More Trucks in Use than any other Exclusive Truck Builder*



# An Achievement —and a Pledge!

**T**HREE YEARS AGO, when we first started in business, we had little more than the dogged determination to give to the automotive dealers of America a wholesale distributing service second to none.

Today our sales volume is running at the rate of \$5,000,000 a year, and more than 18,000 dealers are buying from us regularly.

This remarkable growth is only the result of equally remarkable policies:

The consistent high quality of our merchandise. Our promptness in shipping all orders. The completeness of our line—both in tires, tubes and accessories. The definite mileage guarantees under which all of our tires are sold. The fairness, promptness, and liberality with which all adjustments are made with the dealer. Our policy of permitting the dealer to make his own tire adjustments with his customers. Our free Exchange Plan—under which a dealer may return for exchange or credit any merchandise which he can not sell. Our many forms of selling help, offered without charge to our dealers to help them move the merchandise from their shelves to the consumer. Our protection to the dealer through refusing to accept business from consumers. Our exclusive selling agency plan—which insures the dealer full benefit from his efforts to work up a trade in his community for any of our brands of tires.

We shall continue to adhere to these policies in the future as we have in the past.

*This is our pledge!*

**The Better Tires Co.**  
MICHIGAN AVE. & 18<sup>TH</sup> ST., CHICAGO, U.S.A.





# Has your jobber's salesman told you *about the big profit in Re-conditioning?*

Guesswork has been the big factor in determining profits from "overhauling." The repairman has been unable to tell in advance what a motor overhaul job would cost and how long it would take. These uncertain elements have kept many car owners away from repair shops. Motor Re-conditioning under the McQuay-Norris plan makes live prospects of these same car owners. Selling motor Re-conditioning opens up new opportunities for profits—profits that were impossible under the old guesswork methods.

## Operating as a McQuay-Norris Motor Re-conditioning Station enables you:

- To completely re-condition a motor in one or two days.
- To quote a flat price to the car owner in advance.
- To do the whole job at a far lower price than before.
- To make greater profits than you have ever made before.
- To re-equip the motor with the finest replacement parts made.

The McQuay-Norris Motor Re-conditioning Plan is simply a method by which motor Re-conditioning can be sold by the job at prices fixed in advance and done within a period of time also fixed in advance.

To line up for the big profits in motor Re-conditioning does not require any big tool investment. The addition of one or two inexpensive tools to your present equipment is all that's needed.

National Advertising in The Saturday Evening Post and other publications will help swell the profits of repair shops operating as McQuay-Norris Motor Re-conditioning Stations. When you put up the McQuay-Norris Motor Re-conditioning sign you show every car owner that passes that this Nationally Advertised service can be obtained in your shop.

If your jobber's salesman hasn't told you about this new plan for profits, make it a point to ask him, or write us and we will see that you are fully informed of the whole plan.

## MCQUAY-NORRIS MANUFACTURING CO.

General Offices, St. Louis, U. S. A.

Factories: St. Louis, Indianapolis, Connersville, Ind., Toronto, Canada

### BRANCH OFFICES:

New York	Chicago	Philadelphia	Detroit	Dallas
San Francisco	Kansas City	Seattle	Boston	Pittsburgh
Atlanta	Memphis	Omaha	Minneapolis	Columbus
		Oklahoma City		



*This outside sign spots your shop as a station for this new service. Car owners will look for it. Ask your jobber's salesman or write McQuay-Norris Manufacturing Co., Dept. M, St. Louis, how to get one.*

# *The New* MCQUAY-NORRIS MOTOR RE-CONDITIONING PLAN

Copyright 1923, McQuay-Norris Mfg. Co.



# HOOD TIRES *for* 1924



*At  
the Sign of  
the HOOD  
Service Man*

For twenty-seven years the Hood Rubber Company has made rubber footwear. For eleven years, Tires have been made under the Hood name.

The Tire division is a substantial and growing part of the Hood business. The Hood 1924 line will be most attractive—both in appearance and price.

Better than ever in wear, and you know the reputation Hood Tires have established and maintained for years.

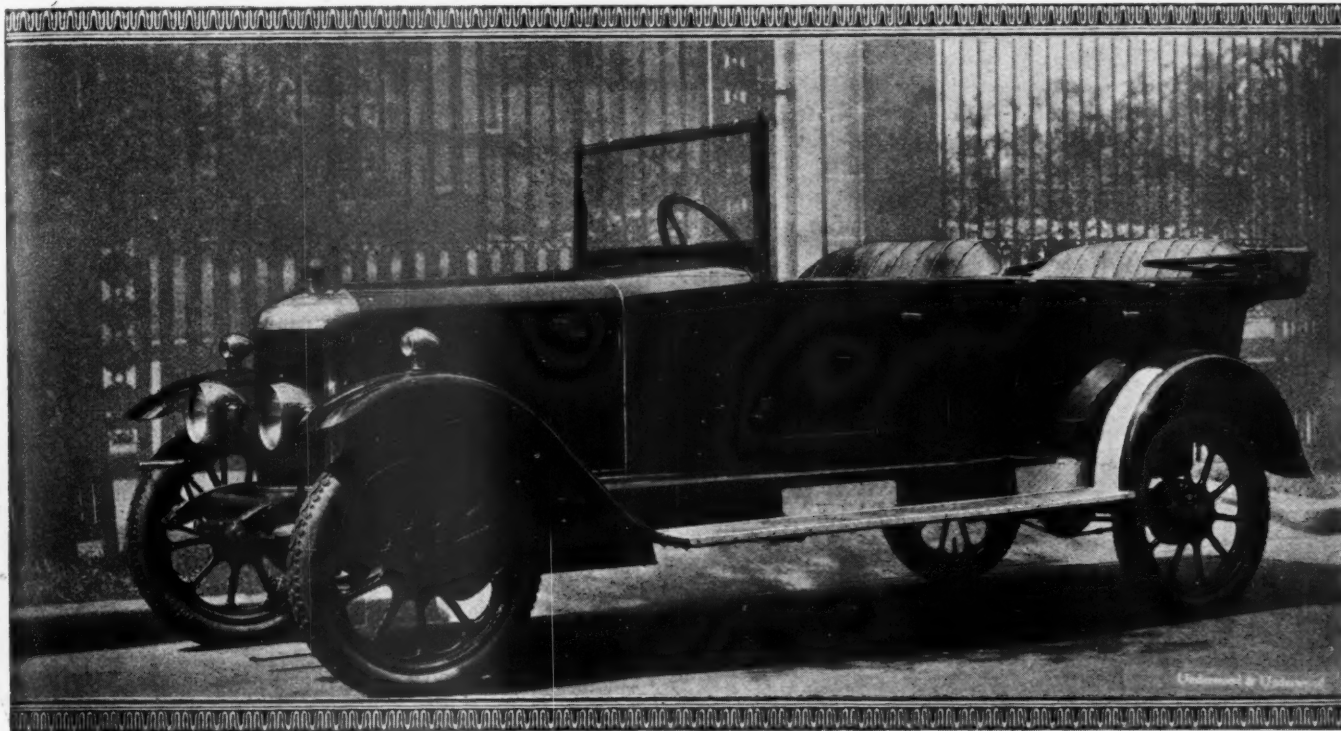
You may have heard that Hoods were high-priced, also, but that is a relic of the past.

Don't sign up for 1924 until you have seen the Hood Salesman, who will be around in October.

**HOOD RUBBER PRODUCTS CO., Inc.**  
Watertown, Massachusetts



# DEEMSTER



## 35 to 40 miles to each gallon of gasoline

### *Chassis Specifications of Deemster Automobiles*

WHEEL BASE—110 in.  
TREAD—50 in.  
TIRE SIZE—30 in. by 3½ in.  
ENGINE—Own make, three ball bearing crank shaft, splash and force fed lubrication, four cylinders, two and three-quarter inches bore by four inch stroke.  
HORSEPOWER RATING—12.  
COOLING—Thermo syphon.  
TRANSMISSION—Own make, gear ratios 4.5, 8.2 and 13.8 to 1.  
DRIVE—Standard Spiral Bevel.  
CARBURETOR—Zenith.  
ELECTRIC STARTING AND LIGHTING  
IGNITION—Magneto.  
CLUTCH—Dry Disc.  
BRAKES—Service and emergency on rear wheel drums.  
SPRINGS—Semi-elliptic front, and cantilever rear (Hotchkiss type).  
WEIGHT—1250 Pounds.  
LAMPS—Submarine type nickel plated head and side lamps.

THE new DEEMSTER automobile, which is guaranteed to give you from 35 to 40 miles per gallon of gasoline, will be ready for delivery in the spring of 1924.

MODELS: Roadster with rumble seat, four passenger touring, and Cabriolet.

These cars have a tread only six inches narrower than standard—that means from 12 to 15 inches narrower at the mud guards—just enough to let you slide through that opening you have been longing to get through to save time and be first on the getaway.

While rated at 12 H. P., this wonderful motor will develop over 50 H. P. at top speed. There is more than plenty of power. We guarantee these cars to exceed sixty miles per hour when required.

Everything any motorist can possibly want is found in these cars—they are quick on the getaway, fast on the road, economical to operate (average operating cost less than ¾c per mile), beautiful to look at (genuine leather upholstery and British coachwork throughout), and the price is remarkably low.

*Write to*

**DEEMSTER CORPORATION OF AMERICA**  
No. 342 Madison Avenue New York City





## "Arrow Head" Quality Must Always be Maintained

ARROW HEAD Products represent the best in Piston, Piston Pin, Axle and Drive Shaft manufacture.

We have hundreds of thousands of dollars invested in a modern factory and specially designed machinery.

Every dollar of this investment is being used to maintain "Arrow Head" Quality.

Inspection, tests and use will prove Arrow Head superiority to you.

ARROW HEAD STEEL PRODUCTS CO.  
MINNEAPOLIS, MINNESOTA



ARROW  
HEAD  
STEEL  
PRODUCTS  
Co.

MINNEAPOLIS  
MINN.

# Arrow Head Products

*The "Arrow Head" is Your Guarantee*

## Basco Locking Door Handles



## Reduced in Price

**\$4<sup>00</sup>**  
*per pair*

**A** BETTER price on this better handle! A price that gives your customer full protection on Ford Coupe or Sedan at Four Dollars—with a generous profit for you!

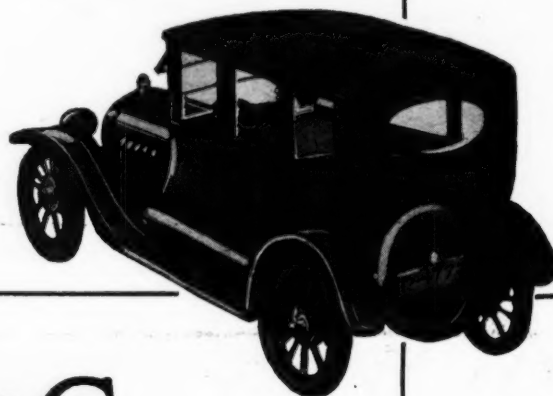
There's "good stuff" in these Basco Locking Handles, too—special, extremely strong zinc alloy, beautifully nicked and polished, and within a tumbler lock mechanism identical with that used in Basco Hardware that graces some of America's finest makes of cars.

No inside latch or dummy handles, but a smart, safe lock on either door. Wide variety of keys gives added security.

Other Basco Products: Body Hardware, including door, pillar, deck and compartment locks, non-locking door handles and knobs; Lighting, ignition and starting switches, generator and regulator cut-outs, horns, etc. Write for name of nearest jobber.

### Ford Sedans and Coupes

Every owner of either model is a prospect for Basco Locking Door Handles. He cannot buy better protection for car and contents.



**Briggs & Stratton Co.**  
Milwaukee  **PRODUCT** **Wisconsin**



# SELL THE ONLY OIL RING WITH A MILEAGE GUARANTEE



## Easily sold—easily installed!

You'll find it just as easy to sell Sav-Oil Rings as it is to install them.

Because the features incorporated in the design of Sav-Oil rings have been proven correct by years of service, and our guarantee of 1000 miles to the gallon of oil, or money refunded stands squarely behind every sale.

The scientific principles of the Sav-Oil ring make it the most imitated ring on the market—see that your customers get the genuine. "Sav-Oil" is stamped on the bottom of every ring.

Order now and be ready for the early Fall business!

*Territories open for Distributors*

**The Sav-Oil Ring Mfg. Co.**  
1037 So. Figueroa St. Los Angeles

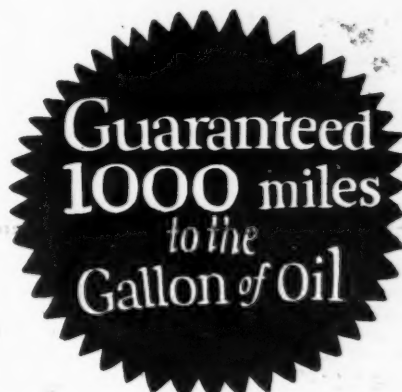
Sav-Oil Piston Ring Co.  
2056 Jackson Blvd.  
Chicago, Illinois

Sav-Oil Ring Mfg. Co.  
550 Golden Gate Ave.  
San Francisco, Cal.

H. W. Blevins  
1532 Grand Ave.  
Kansas City, Mo.

H. C. Alexandria  
612 W. Seventh St.  
Little Rock, Ark.

C. H. Mountjoy & Co.  
211 Third St.  
San Antonio, Texas



### Free to Dealers

We want you to install a set of Sav-Oil rings on your own personal car—at our expense. This is our best bet to prove to you the real value of Sav-Oil rings.

This test will explain why they are the most imitated oil rings on the market. Fill out and mail the coupon for your set.

Sav-Oil Ring Mfg. Co., 1037 So. Figueroa St., Los Angeles

Name.....

Address.....

Town.....

Size of Ring.....

Car.....

The evening ride—  
a family outing, a  
business talk, an  
intimate hour with  
friends—is a time  
for quiet relaxation



## "We can have a quiet talk as we ride"

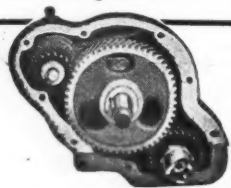


### Where you can get Celoron Gears

Service station and repair men know how to make timing gears silent. They can replace noisy metal gears with Celoron Silent Timing Gears.

Celoron is made into silent timing gears for the replacement trade by Dalton & Balch. Jobbers all over the country carry full stocks of these gears.

Look for the Celoron mark. It is found on all D & B Silent Timing Gears.



ON the open road after dinner, car owners seek recreation from the cares and confinement of the day's work.

The pleasure and benefit of the evening ride depend upon the smooth, quiet performance of the car.

Noise in the engine brings worry to the motorist. There is no pleasure in driving a car with pounding bearings, tapping valves, or snarling, grinding timing gears.

All-metal timing gears grind and howl when they become worn. Timing chains stretch, thrash, and break. The only remedy is to install a new chain, a long and expensive job.

Celoron Silent Timing Gears are non-metallic. They eliminate rasps,

grinds, and howls. They retain accurate timing.

Celoron Silent Timing Gears are resilient, cushioning shocks and reducing wear on steel mating gears. They are water-, oil-, and grease-proof.

*Celoron Silent Timing Gears are standard equipment on many cars. They can be used in any timing gear train.*

The men who drive your car can be kept free from the worry and irritation of noise in the timing-gear case. Celoron Silent Timing Gears will help make the engine quiet, keep the owner's good opinion. Drop us a line for complete information that has influenced many manufacturers to standardize on Celoron Silent Timing Gears for their new models.

### Diamond State Fibre Company

BRIDGEPORT

(near Philadelphia)

PENNSYLVANIA

Offices in Principal Cities

In Canada: Diamond State Fibre Company of Canada, Limited, 245 Carlaw Ave., Toronto

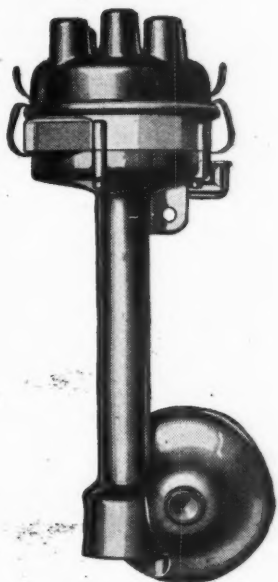
# CONDENSITE CELORON SILENT TIMING GEARS

Make Celoron Silent Timing Gears standard equipment on all your future cars



# ATWATER KENT

*Makers of*  
THE WORLD'S HIGHEST GRADE IGNITION  
STARTING AND LIGHTING



TYPE LA  
FOR THE  
**FORD**

Price

**\$10.80**

including cables  
and fittings

ATWATER KENT Ignition  
Type LA for Ford  
Motors, maintains the  
high quality of ATWATER  
KENT standards in design,  
construction and per-  
formance.

It offers to more than  
5,000,000 Ford owners  
every ignition advantage  
enjoyed on the more ex-  
pensive cars.

It offers to every dealer a  
rapidly selling product that  
carries a reasonable profit.

ATWATER KENT MANUFACTURING CO.

4957 STENTON AVENUE, PHILADELPHIA, PA.

## The GUIDE and SENTRY of the Night

A guiding light—a pathfinding companion at your side. That is the Victor Spot Lamp—far-reaching into the darkness and unfaltering.

And when “on location” the little red and white sentry comes into play. The Victor Firefly Parking Lamp you can leave with a sense of security that it will not fail.

This intrepid pair appeals to the car owner in the interest of his vehicle—and that means sales—sales you cannot afford to miss. We equip the spot light with special brackets for closed cars and motorcycles.

*Write for details.*

**THE CINCINNATI VICTOR  
COMPANY**

714 Reading Road

CINCINNATI

OHIO

*Owners, by purchase, of the Jobbers'  
Division of the Corcoran-Victor Co.*

### VICTOR (No. 100) SPOT LIGHT

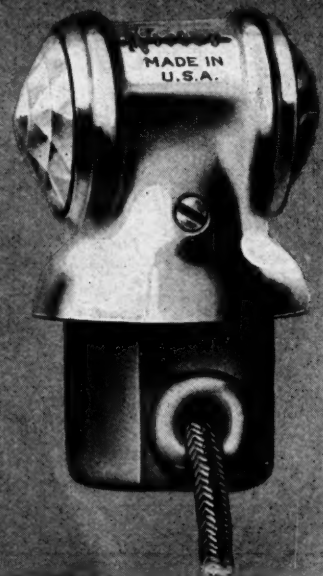
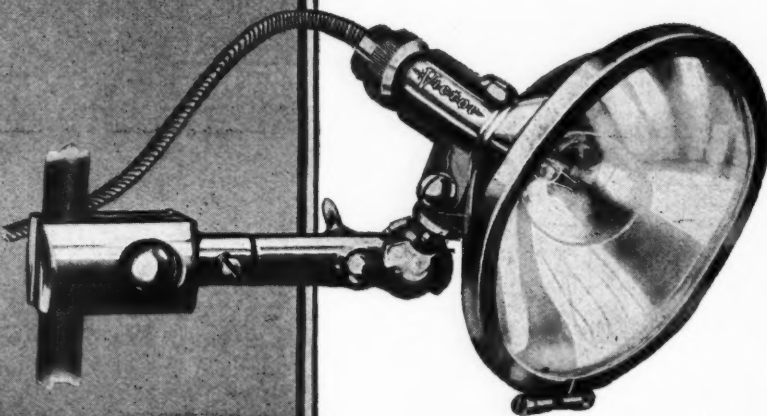
Black Enamel  
or All Nickel

### VICTOR FIREFLY (No. 45) Parking Lamp

# Victor

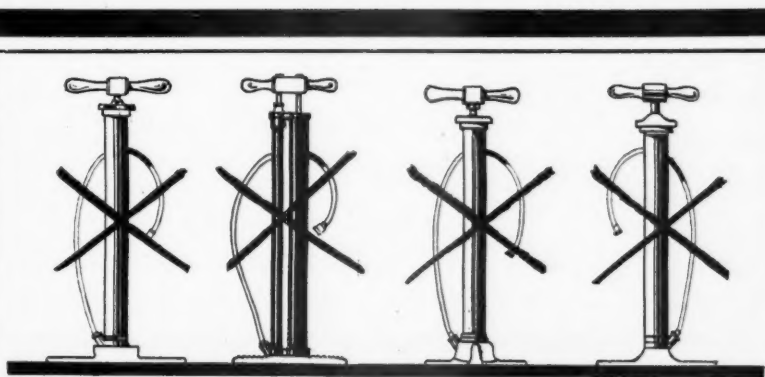
TRADE MARK

## AUTOMOTIVE LAMPS





# No Other Tire Pump Has It!



No tire pump without a **PERMANENT** means of lubricating the valve leather can be expected to stand up long in service. The leather has a tendency to become hard and brittle. When the pump is used the leather cracks. The air, instead of being forced to the tire, leaks back into the barrel.

The **MONROE**, with its **PATENTED** self-oiling washer, is the **ONLY** tire pump that effectually overcomes this great disadvantage. The valve leather is kept **CONSTANTLY** soft and pliant. Full compression, **ALWAYS**, even though the pump may be out of use for months at a time.

Because of this **EXCLUSIVE** feature and other important advantages, the **MONROE SELF-OILER** is the practical pump for you to stock. Sells at a very low figure—yet brings you a liberal profit on every sale. Fast turnover—no dead stock. Ask your jobber! Have him send you a trial order. You'll find it pays.

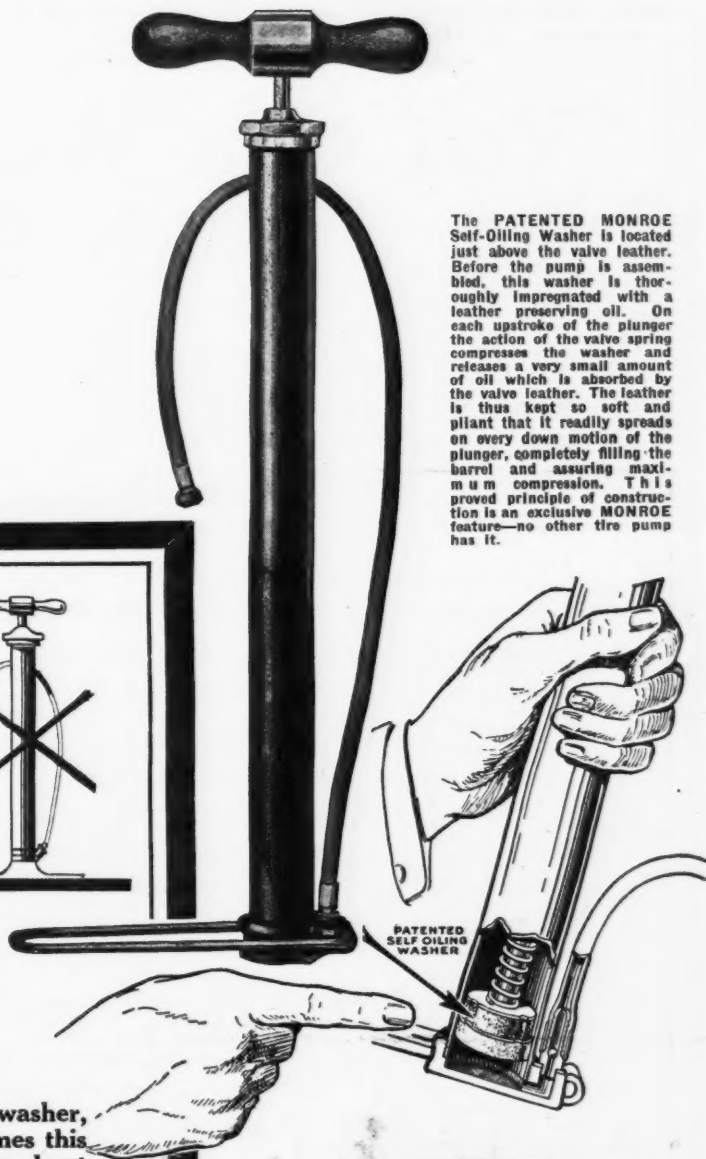
*Full particulars and prices upon request.*

**Monroe Auto Equipment Manufacturing Co.**  
**Monroe Michigan**

Sales Representatives to Jobbers Only  
**The Fulton Company Milwaukee, Wis.**



The Monroe Closed Car Spotlight Bracket and the Monroe Brake Shoe for Fords offer two additional sources of splendid profit. Small investment. Year-round sellers. Send for full particulars.



The **PATENTED MONROE** Self-Oiling Washer is located just above the valve leather. Before the pump is assembled, this washer is thoroughly impregnated with a leather preserving oil. On each upstroke of the plunger the action of the valve spring compresses the washer and releases a very small amount of oil which is absorbed by the valve leather. The leather is thus kept so soft and pliant that it readily spreads on every down motion of the plunger, completely filling the barrel and assuring maximum compression. This proved principle of construction is an exclusive **MONROE** feature—no other tire pump has it.



In place of the standard screw connection this thumb-lock hose connection may be had, if desired, for but a slight additional cost.

# You Can Win New Trade With Premier

Hundreds of thousands of car owners who must watch the first cost of a tire are anxious to buy low-priced casings which are supported by quality and a good name.

Right in your own locality many people are buying unknown value because they don't know they can get reputable ones at a low price.

These people are ready-made prospects for you. Tell them about Fisk Premier Cords. Put this good, low-priced tire in your window. You'll

increase your volume and your profit, and gain solid, new customers because of the surprisingly good service Fisk Premiers will give.

A Fisk product, built to sustain a reputation we hold priceless, this good tire gives you the chance to win new trade and hold it.

If you do not sell Fisk Tires, write us, and we shall gladly extend to you the full cooperation which makes the Fisk policy so popular with dealers.

*There's a Fisk Tire of extra value for  
every car, truck or speed wagon*

**THE FISK TIRE COMPANY, Inc.**  
Chicopee, Falls, Mass.





## FREE AIR AT THE SEASHORE

### A Dependable Compressor Delivers the Goods

**H**OME comforts!" That's what they demand. The thousands of tourists who touch Atlantic City each year want trouble-proof service—and they get it at the Circle Garage. Three air compressors are working all the time, and on an average day the traffic around the Circle Garage looks like a four day celebration. To handle this big business without a chance of slipping, they installed dependable equipment—three Franklin Money-Saving Super Single Stage Air Compressors.

#### Dependability Counts

The Franklin is a bear for hard work, but it isn't the salt air that steps it up at the seashore. It will do the same work anywhere, because that's what it's built for. Every part on it is simple in design, strong and durable, from the pressed steel deck and legs to the exclusively designed Super Single Stage Compressor.

#### A Real Compressor

Super Single Stage! It's been many a year since air compressors have had any real improvement, and the Franklin has it now. The cylinder of this compressor keeps cool, no matter how hard you work it. It's designed to get rid of heat as quickly and surely as is possible. That's why instead of ordinary parallel fins, it has spiral (or helix) fins that add 15% more cooling area. In this way the hot air rises naturally and slides right off. You know the value of a cool cylinder—it means real service.

#### A Big Feature

If you can start your motor without a load, you can save time and money. That's what the Franklin does. The patented Unloader holds open the compressor intake valve until the motor speeds up, then the Unloader drops out of line, the valve closes, and she's off! It takes only twenty seconds to do this, but it permits the use of a much smaller motor than is used on ordinary compressors, and a smaller motor saves money.



#### Leak-Proof

No leaks and trouble with a Franklin Air Line Manifold. You're not bothered with T or L joints or nipples, instead a simple manifold made of malleable iron. The special oil separator keeps oil and sediment from getting into the tires, and also acts as an air expansion chamber. You get a steady, even flow of air because it expands in the oil separator before entering the tank through the dash-pot check valve.

#### Save Time and Trouble

The dependable automatic pressure control switch is a big thing for the busy garage or service station. When pressure falls to 120 pounds, the switch snaps and the motor starts. In less than six minutes it pumps to 150 pounds and then the switch throws out. The contact is made positive by a powerful spring—no danger of an arc or burnt point.

#### The Price is Low

The Franklin has a tank of 32 gallons capacity, tested to 300 pounds hydraulic pressure. It is the proper size to serve any garage up to 120 cars, or 90% of all garages or service stations. We make this one size only—the reason for the price of \$225 f.o.b. Norristown.

#### Stop The Leaks

"A small leak will sink a great ship," said old Ben Franklin. A small leak will sink your business and that leak may be in your compressor equipment. Stop it with a dependable, money-saving Franklin Super Single Stage Air Compressor. It will give you years of hard service. The low initial cost and the low upkeep make it the compressor you ought to have. Order yours today, or write for details.

# Franklin Money Saving AIR-COMPRESSOR

FRANKLIN AIR COMPRESSOR WORKS



2604 MAIN ST., NORRISTOWN, PENNSYLVANIA

SEND THIS COUPON  
FOR FULL SPECIFICATIONS

Tear out and mail today to—

FRANKLIN AIR COMPRESSOR WORKS - 2604 Main Street - NORRISTOWN, PA.

Write your name and address in space below:

## Two leading cars, in distinctly different price classes, will shortly announce adoption of Lockheed Hydraulic Four Wheel Brakes as standard equipment.

These coming announcements are the forerunners of several others, by manufacturers of cars in various classes, which may be expected within a comparatively brief period.

Lockheed hydraulic brakes are thus the first four wheel brakes to be hailed as a certain, unqualified and complete success.

Every automotive engineer we know of, who has thoroughly investigated four wheel braking, favors the hydraulic principle.

Among the many engineers who have gone into the subject of four wheel brakes from the hydraulic as well as from other angles, are some of the most eminent men in the profession.

It is a further fact that these automotive engineers invariably declare that four wheel brakes can be both completely efficient, and completely practical, only when the braking power is transmitted through fluid.

That is why Lockheed hydraulic four wheel brakes are now winning their

way rapidly into motor cars in every price class.

Prominent merchandisers of motor cars, including some of the largest and most successful distributors in America, have expressed strong preference for Lockheed hydraulic brakes.

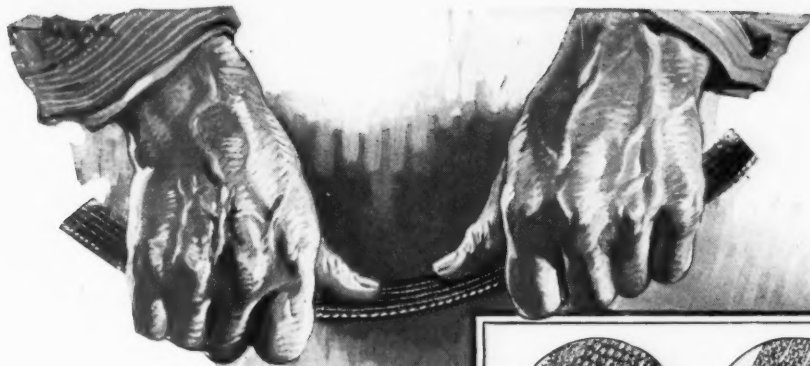
They declare, furthermore, that rapidly accumulating experience will eventually result in Lockheed hydraulic four wheel brakes as standard equipment by nearly all motor car manufacturers, as the only really efficient and practical means of applying braking power to four wheels.

**Hydraulic Brake Company**  
700 Harper Ave.      Detroit, Michigan

# LOCKHEED

## Hydraulic Four Wheel Brakes





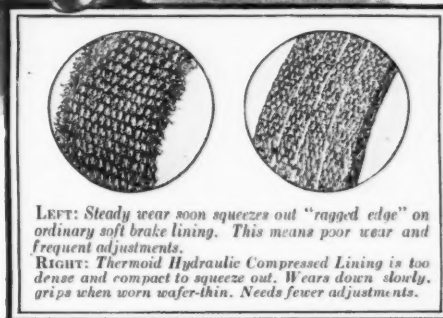
## Here's why

*it wears down so slowly instead of mashing down quickly*

Take a short strip of Thermoid Compressed Brake Lining. See how compact it is as compared to an ordinary lining. Feel its density, its weight. This solid compactness makes Thermoid grip evenly and wear longer.

Tremendous hydraulic pressure—2000 pounds of it—takes all further “give” out of Thermoid. In its place is compressed 40% more material than you find in any other brake lining made.

This compression, this extra material, gives you constant gripping power and longer wear till Thermoid is worn wafer-



LEFT: Steady wear soon squeezes out “ragged edge” on ordinary soft brake lining. This means poor wear and frequent adjustments.

RIGHT: Thermoid Hydraulic Compressed Lining is too dense and compact to squeeze out. Wears down slowly, grips when worn wafer-thin. Needs fewer adjustments.

thin. It makes Thermoid wear down slowly instead of *mashing* down quickly.

### **Thermoid doesn't “squeeze out”**

Look at the edge of an ordinary brake lining—“squeezed out” on the drum. The tremendous hydraulic pressure on Thermoid takes out this excess “give.”

That is why Thermoid is the last to show the “ragged edge” between drum and brake band. Watch, yourself, for this evidence of Thermoid's wearing quality.

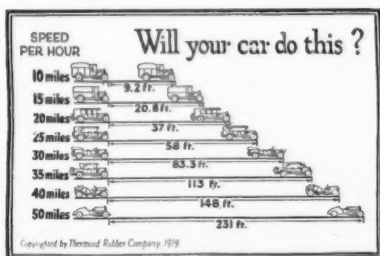
Thermoid is also *grapnelized*—a special process which absolutely prevents it from grabbing, slipping or absorbing moisture.

National advertising is telling the Thermoid story to millions of motorists throughout the country this year. Write for full information about sales helps furnished to all Thermoid dealers.

### **THERMOID RUBBER COMPANY**

Factory and Main Offices, Trenton, N. J.

New York	Chicago	Los Angeles	Detroit
Cleveland	Kansas City	Seattle	Atlanta
Boston	London	Paris	Turin
	San Francisco		



Famous Thermoid Standard Chart—shows distances in which car should stop if brakes are efficient. Brakes lined with Thermoid meet these standards.

# Thermoid Brake Lining

## Hydraulic Compressed

Makers of “Thermoid-Hardy Universal Joints”  
and “Thermoid Crolide Compound Tires”



## Makes every Ford motor “hum a little sweeter”

**Rexoid—a new transmission lining  
whose compounds cannot dis-  
solve and foul up your oil**

You've got to have the lubrication right—your oiling system *must* be kept clean. And one of the greatest dangers to proper lubrication is found in a transmission lining which dissolves its harmful treating compounds in the oil. Most treated linings do this.

Rexoid is different. It was made *specifically to overcome this fault* and to provide reliable gripping. It does both, and the proof lies in its actual performance under the most exacting of tests.

**An astonishing difference in five  
leading makes**

At the right is shown a startling test of five different makes of treated lining. The varying shades of the oil in the beakers mark the extent to which each make dissolved its compounds in the short space of *six hours*. Note the oil in the fifth beaker. It remained absolutely clear—not only after six but after forty-eight hours of continuous soaking.

The lining it held was Rexoid—the new Ford Transmission Lining that is *insoluble in oil*.



*After 48 hours in oil, four makes of lining (A, B, C, and D) had discolored the oil, giving off tar and other harmful ingredients. The only lining that did not foul up the oil was E—Rexoid.*

Only in Rexoid do your customers get this insoluble compound. It is compressed, practically vulcanized, into every fibre of a high-grade woven fabric. Compound and fabric become one solid mass.

This hydraulic treatment gives Rexoid

1. More material to the square inch
2. A smoother surface and a longer life.

Tell your trade the facts about Rexoid. It's easy to sell, and because it fills a real need your customers are satisfied. This means continuous profits to you.

Leading jobbers carry Rexoid. If your jobber cannot supply you, send us his name.

**THERMOID RUBBER COMPANY**

*Factory and Main Offices, Trenton, N. J.*

New York  
Cleveland  
Boston

Chicago  
Kansas City  
London

Los Angeles  
Seattle  
Paris  
San Francisco

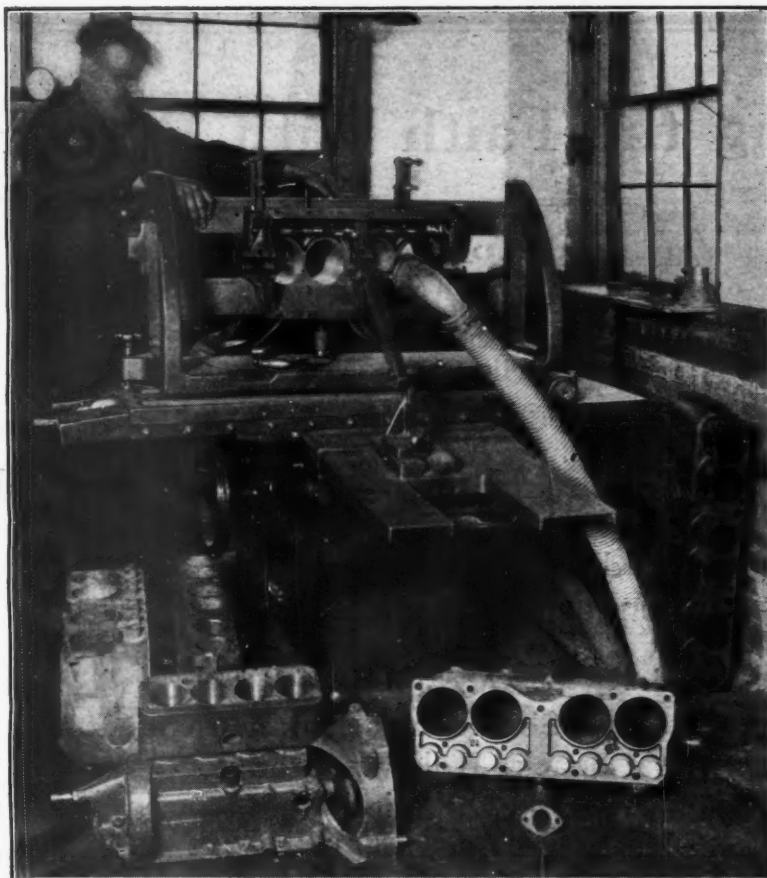
Detroit  
Atlanta  
Turin

# REXOID

**Transmission Lining for Ford Cars**







## Ask Peters—He Knows

In Paterson, New Jersey, the Peters Motor Co., conducts a cylinder grinding shop, handling the work of several garages and service stations.

When Mr. Peters decided to get into this business, he didn't place his order for the first cylinder grinding machine that was offered him or he had seen in operation in a neighboring town — he looked around a bit and got quotations. The result of this was that he got a LANDIS.

The LANDIS can be sold for less be-

cause it is an extremely SIMPLIFIED machine and is a part of the VOLUME enjoyed by the world's largest maker of grinding machines.

Only TWO traverse speeds. TWO eccentric speeds. TWO spindle speeds (Why pay for more—mechanics don't need them and never USE them). Every detail worked out in regulation LANDIS style—for doing a real job in the shortest possible time.

Before placing your order, get a Landis quotation.

# LANDIS

LANDIS TOOL CO., WAYNESBORO, PA.  
New York Office—51 Chambers St.

## Keeping the Faith with Both Parties

### A B P Standard No. 6

"To solicit subscriptions and advertising solely upon the merits of the publication."

THE A B P publication must be worthy of the consideration of both subscriber and advertiser, primarily on its merits. But the final, basic rule in determining all policies, is number one of our Standards—"To consider first the interests of the subscriber."

The good physician has nothing to sell but Service, his ability to treat human ailments. Should he sell pretense, cure-alls, or subterfuges, he becomes a quack. Likewise, the good business paper has nothing to sell but Service, and it is the avowed ambition of our publishers to render clean, honorable service to both subscribers and advertisers, of such a character as to command recognition for its own sake alone.

### A B P Standard No. 7

"To supply advertisers with full information regarding character and extent of circulation, including detailed circulation statements subject to proper and authentic verification."

A NATURAL sequence of No. 6, as you perceive. In every business there must be standards of measurement, and we have taken the lead in enforcing a uniform method of measuring and counting circulation.

Every A B P paper must have its circulation records audited by The Audit Bureau of Circulations, which assures absolute accuracy and a standard unit of measurement.

This means a lot to advertisers, but

it has a real significance for subscribers too. The inevitable tendency of standardization in any business, is to *cut out*

waste, to reduce costs, and to stabilize and define values.

The benefits of this policy are bound to reach the ultimate buyer in the form of reduced selling costs and better sales methods. Here again we are hewing to the line laid down by our Standard No. 1—"To consider first the interests of the subscriber."

## THE ASSOCIATED BUSINESS PAPERS, Inc.

JESSE H. NEAL, *Executive Secretary*

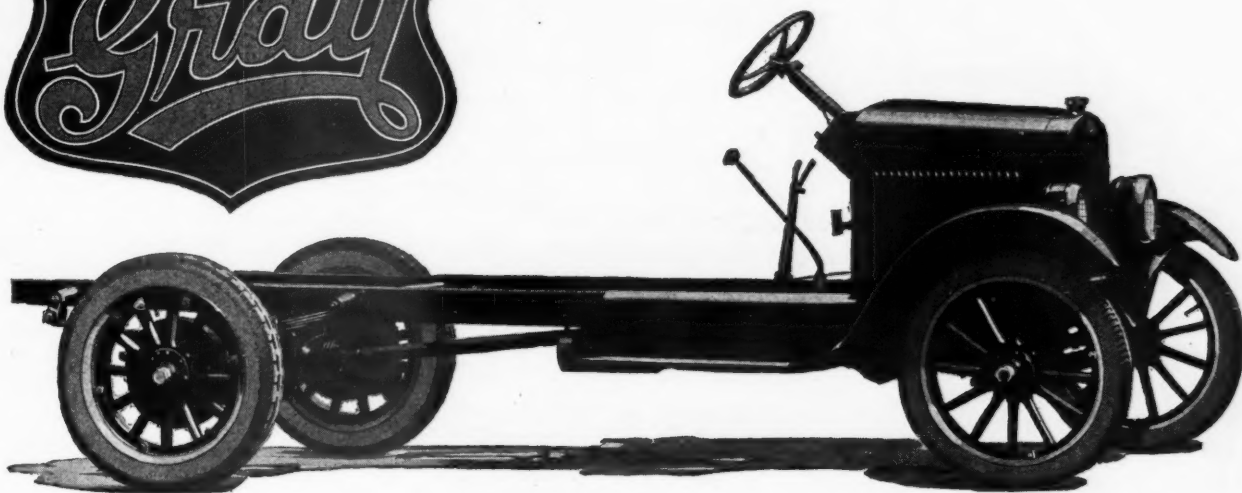
HEADQUARTERS:

220 WEST 42nd STREET

NEW YORK CITY

*Motor Age is a member of the A. B. P., Inc.*





## —and Now The Gray Truck

**T**O ROUND out and complete the line of already thoroughly successful Gray passenger cars, we have added the Gray Truck.

Aside from its heavier construction for truck purposes, the Gray Truck is characterized by the same sturdy specifications, the same rugged construction and economy of operation, which brought to Gray passenger cars the world's official economy record of 33.8 miles per gallon of gasoline on a run from New York to San Francisco. The power plant is the dependable, low speed, low compression Gray engine—a type of engine particularly designed for maximum pulling power on hills and under capacity loads.

Anywhere in the field of light delivery, where frequent stops, speed on the route and minimum delivery cost per package are absolutely essential, the Gray Truck delivers a type of transportation service heretofore unknown.

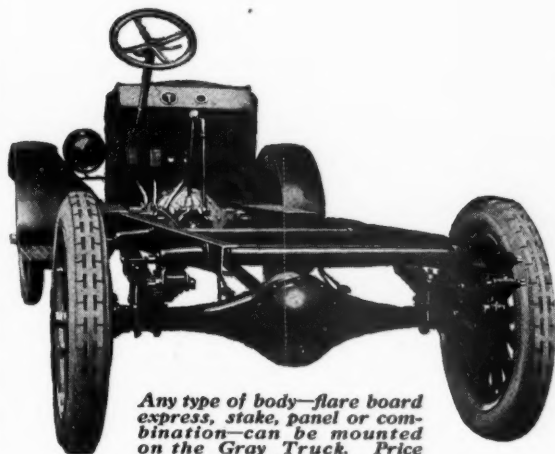
You, too, can round out and complete your line with the Gray Truck—and get your share of the constantly increasing demand for a light truck of this class. It is the last word in up-to-date light truck construction and bound to be a winner.

Gray dealers are selling cars. Inquire today regarding open territory.

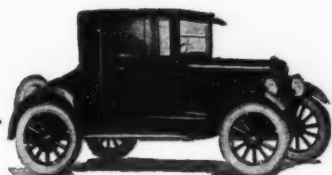
### GRAY MOTOR CORPORATION DETROIT, MICHIGAN

Roadster	\$510	Touring	- -	\$520	Coupe	\$685
Coach	- \$785	4-Door Sedan		\$835	Truck	\$575

All Prices f. o. b. Detroit



Any type of body—flare board express, stake, panel or combination—can be mounted on the Gray Truck. Price of chassis alone, completely equipped with jack, tools, etc., \$575 f. o. b. Detroit.



Coupe



4-Door Sedan





# LOWER COST PLUS BETTER SERVICE

The companies who desire the best air service at the absolute minimum of expense, are standardizing on

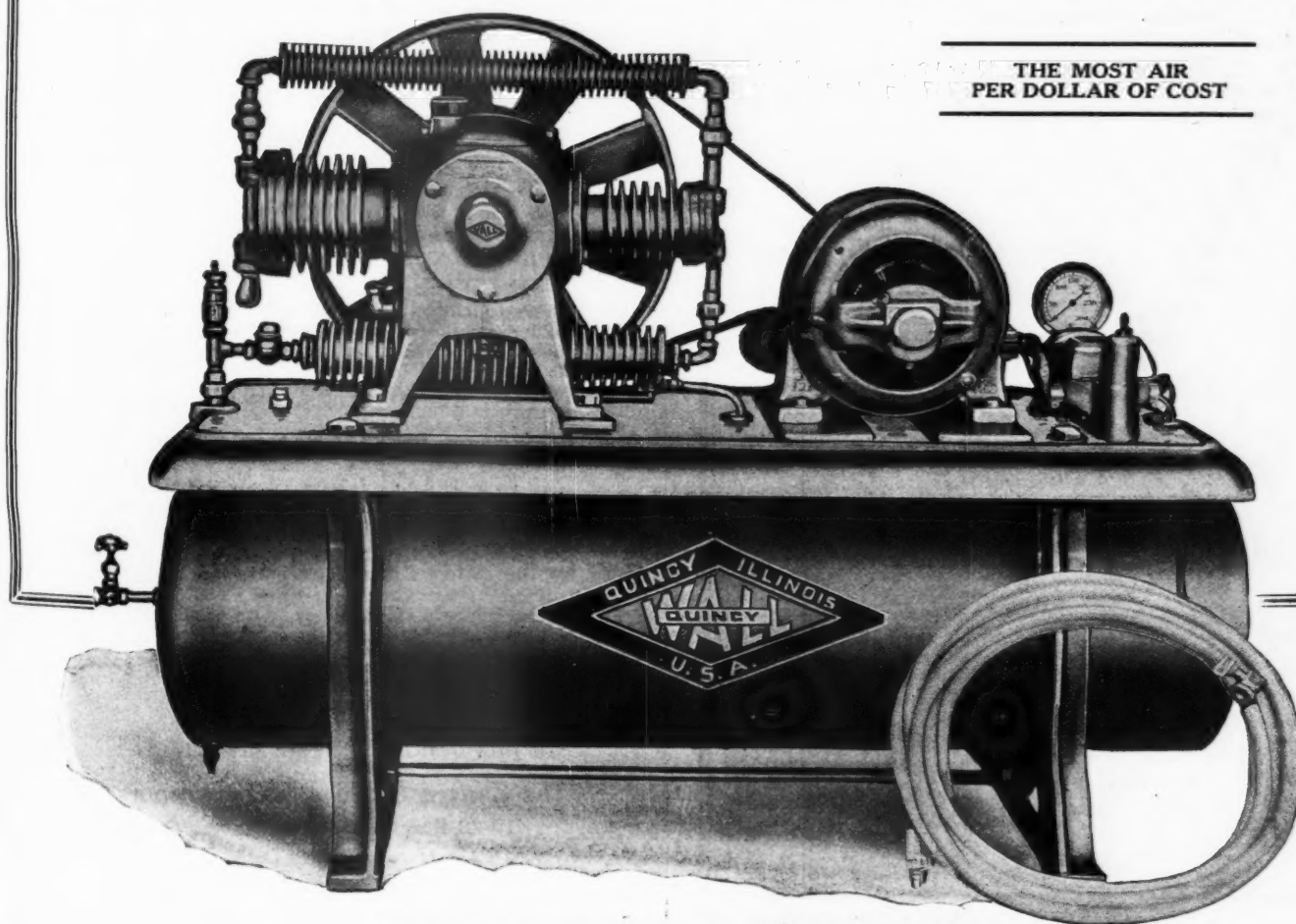
## THE QUINCY SILENT AIR-MASTER

THERE ARE MANY REASONS. It will take only a few moments of your time to get them. For your convenience they have been summarized in a booklet.

Would you like a copy? No obligations.

Some good territory still open for live agents and dealers.

**WALL PUMP AND COMPRESSOR CO.**  
217 Maine Street Quincy, Illinois, U. S. A.



**Model G-16 Two-Stage Automatic Unit**

We specialize in Two-Stage and Single-Stage Air Compressors and Vacuum Pumps.

# HLF

## High Lustre Finish

For Everything Varnished  
or Enamelled

*The Automobile Cleaner  
That Sells in Every Market*

WHEN you sell HLF you don't sell just a "polish." HLF is *not* a polish—it is a cleaner that gives a fine, lustrous, glossy finish—easily and quickly.

When you sell a bottle of HLF you don't sell just one—you sell repeats and repeats. Six years of easy selling have proved the consumer's preference.

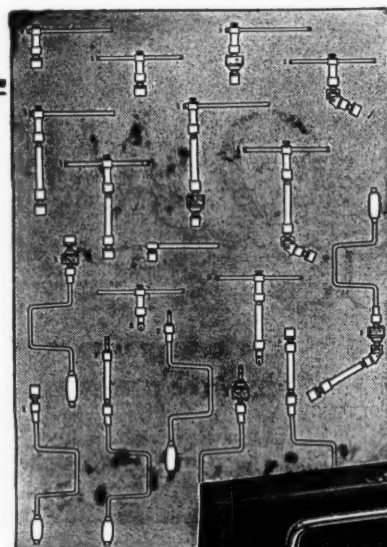
The tests of a standard product—profits, satisfaction, repeat orders, are all met in HLF.

Dealers all across the continent have been uniformly successful with HLF because there is no market where a product that performs so well can fail to repeat.

Wherever you are HLF will sell. Sold through jobbers exclusively, who are fully protected.

H. L. FEASEL'S  
LABORATORY  
8-11-13 Desbrosses Street  
New York

Genuine HLF is in the Oval  
Bottle with Black and White  
Checkered Label.



1—Ten of these  
2—Two of these

H & G  
Universal Set com-  
plete with Speed  
Wrench



# 140 combinations

all in this ONE set

*Mechanic's Dream Comes True*

THE H & G Universal Socket Set complete with Speed Wrench takes the place of a wheelbarrow full of single-purpose tools.

In this set you have everything you need in the way of a wrench. You take it with you from car to car. No time is wasted trying to find the proper wrench.

The application is rapid and natural. The nut to be loosened or tightened determines the socket to be used, which is done at a glance. Its location determines what attachments are required, and they are instantly snapped on and the job is done.

Easy, simple, quick, practical—the better way.

\* \* \*

The Sockets, which are the heart of any set, are stronger, and permit the mechanic to use his strength. They are cold-drawn from bar stock by the Allen Process and are specially heat-treated. Just the right thickness to combine proper margin of safety in strength and still be thin enough to be used everywhere.

Superior in design, strength and workmanship, this set of wrenches will save your time and temper because it is a real tool for real mechanics.

Ask your dealer. Write for literature.

The Eastern Machine Screw Corporation  
10-20 Barclay St., New Haven, Conn.

Socket



Wrench



# The "Super" recommends WK10 and WK20 Safety Motor Starters

"If others can do it, we can"—this was the closing argument of the plant Superintendent in his plea for the installation of WK-10 and WK-20 Safety Motor Starters.

Protection—not only to the operator but also to expensive equipment.

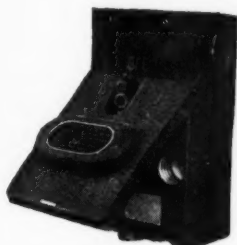
WK-10 and WK-20—a Safety Motor Starter for every a-c. motor, from the smallest to 5 hp.

Write our nearest District Office for Leaflet 3435-A.

Westinghouse Electric & Manufacturing Company  
Mansfield Works                      Mansfield, Ohio



*"This ad.  
gave us  
the tip"*



Type WK-10  
For motors  
up to 2 hp.



Type WK-20  
For motors  
up to 5 hp.

**ELECTRICAL WORLD**

**W**  
WESTINGHOUSE  
ELECTRIC

**W**  
WESTINGHOUSE  
ELECTRIC

**—and liability insurance dropped \$162.**

A box manufacturer of Louisville, Ky., was speaking.

He said his company had installed Westinghouse-Krantz Type WK-20 Safety Motor Starter Switches at a cost of \$180 and a later insurance survey resulted in a reduction of \$162 a year in the company's liability insurance premiums.

\$162 yearly return on an \$180 investment! But it happens often.

Type WK-10, 20, 30 and 100, a Safety Motor Starter for every a-c motor, from the smallest to 15 hp. capacity.

Many other advantages, too.

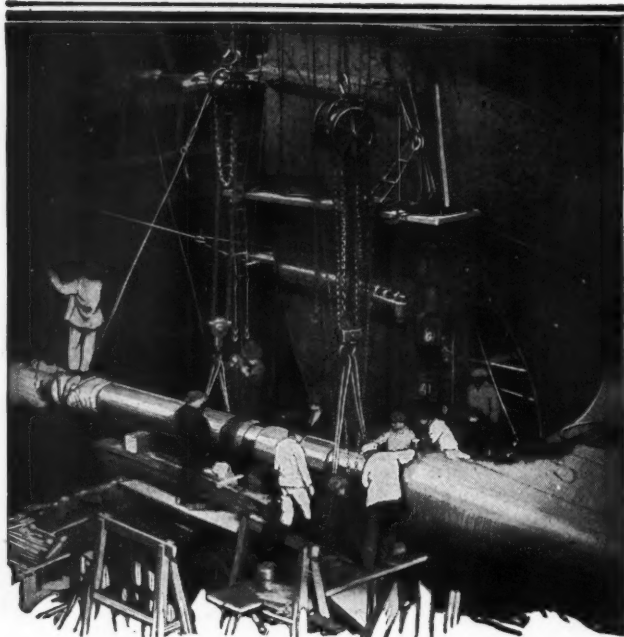
Ask any Westinghouse dealer or write to the address below for Folder 4500.

Westinghouse Electric & Manufacturing Company  
East Pittsburgh, Pa.

# Westinghouse

## CYCLONE HOISTS

HIGH SPEED



### —make light work of heavy jobs!

When the huge propeller shaft of the U. S. S. America had to come out for repairs, Cyclone Hoists bore the brunt of the lifting.

The mechanics, mere pygmies in relative comparison to the giant task before them, aided by Cyclone Hand Chain Hoists handled the ponderous shaft as easily and deftly as though it weighed pounds instead of tons.

Whenever and wherever the men in your plant are up against a lifting job, team them up with a Cyclone Hoist.

*Distributors Everywhere.*

Catalog covering 1 to 40 Ton Hoists, Cranes, Trolleys, and Overhead Track Systems sent on request.

**The Chisholm-Moore Mfg. Co.**  
Cleveland, O.

**Hoists      Cranes      Trolleys**  
**Overhead Track Systems**  
Branches: New York, Chicago, Pittsburgh

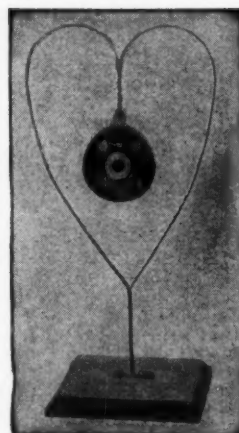
## "Can You Use a Real Salesman?"

*—that won't cost you  
a cent in salary?*

The unique Bell display stand is a counter salesman that really sells timers. More than an ordinary display fixture, it attracts the customer's attention—invites him to examine the simple, efficient construction of the Bell Timer and the customer sells himself.

Just send us your order for 10 or more Bell Timers and we will send you the silent salesman FREE.

## The BELL Timer



is the best Ford Timer made. Practically indestructible. Bakelite shell, copper brush and contact, unbreakable steel spring that insures a uniform constant pressure. Needs no oiling or attention.

Ford owners prefer the sure-fire, long-lasting accuracy of the Bell. Thousands of dealers are profiting by this demand. Are you?

*Sold through all leading jobbers*

**BELL MANUFACTURING CO.**  
13 Elkins St., Boston 27, Mass.

List  
Price  
**\$3.00**

Attractive  
Dealer  
Discounts



*The Best  
to Sell—*

*The Best  
to Buy*



# It Speaks With a Smile But Heard For a Mile

The Aermore Signal has sold to hundreds of thousands—sells easily because it appeals to the motorist's pride, one of his most vulnerable points. It also means economy—Saves the batteries; means safety because it never fails. Operates on exhaust gas.

Easily attached.  
Outlasts the car.



Satisfaction  
Guaranteed

## PRICES

Complete with Valve and Fulton Hand Control.	
No. 00, 22 in. long—Motor Bus Special	\$14.00
No. 0, 17 in. long—for large autos, trucks	12.00
No. 1, 15 in. long—for medium cars	10.00
Ford Special	7.00
Give name of car and outside diameter of exhaust pipe.	



Dealers: Demonstration stand free with order of ten or more Aermores, one or assorted sizes.

# The AERMORE Exhaust Horn



Part of every Aermore Horn, also sold separately for exhaust heaters. Self-closing.  
For exhaust pipe 1½ to 3 in. \$1.80  
For exhaust pipe 3½ to 4½ 3.50

"Make This An  
Automotive Christmas"

## Fulton Shellerite Steering Wheel

Adds to the comfort of driving. Dresses up a car. Will not crack or fade. Made of composition hard rubber. Standard equipment on a number of high priced cars. Aluminum spider inserted in rim. Beaded top corrugated with outside hand grip. Diameter of wheel 17 inches.  
For Chevrolet, Star, Dodge, Maxwell or Overland Cars \$6.00  
For Fords 5.50

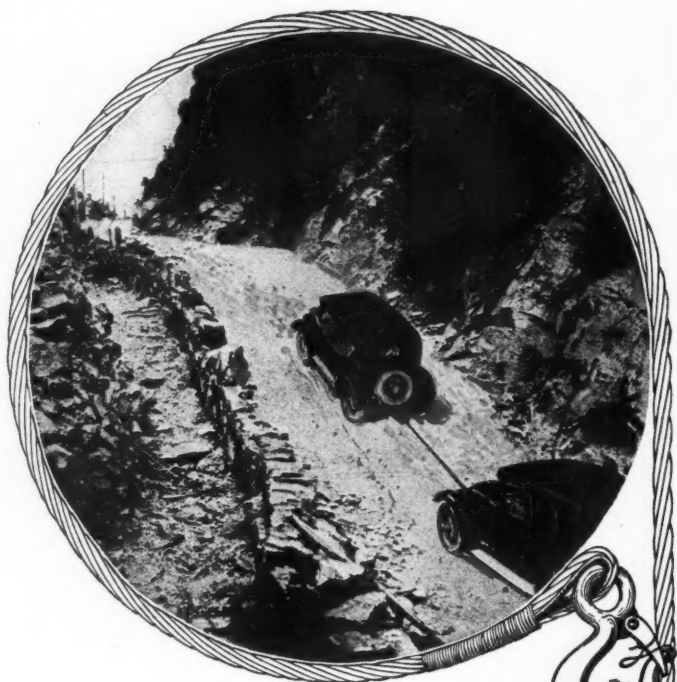


Ask your Dealer. Dealer write Jobber or us.

Manufactured By

# THE FULTON COMPANY

Dept. 15-F Milwaukee, Wis.



## Tows 7000-lb. Limousine Up Mountain

It is conceded by autoists that Crawford Notch, the famous beauty spot of the White Mountains, is one of the severest tests encountered by tourists through New England. Mr. Robert Miller, of St. Louis, recently played good Samaritan to another tourist at Crawford Notch, thanks to Basline Autowline.

From the top of the Notch, Mr. Miller watched his chauffeur tow a disabled limousine from the very foot clear to the top, and then a half-mile beyond to the Crawford House garage.

Mr. Miller says: "I judge that the limousine my chauffeur towed weighed 7000 lbs. or more. This is certainly a sufficient test for 'Basline Autowline.' My chauffeur has since put the same line to severe tests in towing other cars, which would indicate that the line was not hurt by its first severe test."

BASLINE AUTOWLINE, the "Little Steel Rope with the Big Pull," is made of famous Yellow Strand Wire Rope. You can depend on it to pull you out of trouble every time. Fits under seat cushion.

### Money for Jobbers and Dealers:

Basline Autowline pays you a good profit, it sells well, and is the *ONLY* Nationally-Advertised towline on the market. Push it this season.

**BRODERICK & BASCOM ROPE CO.**

ST. LOUIS — NEW YORK



G R 193

# BASLINE AUTOWLINE

## It's Your Own Money You're Spending!

Whether you lose or gain by it makes a bigger difference to **YOU** than to anyone else.

Why *hurry* to spend it? Especially when you're buying a piece of equipment that costs a considerable sum!

An Air Compressor is a serious matter with you. It costs real money.

There are big differences between one compressor and another, differences that do not show on the surface. Why find them out only after you've bought and paid for a compressor? Why not let us show you some of those differences *before* parting with your good money?

There are real *reasons* for a BRUNNER'S slightly higher price. One of them is its *lower cost*—per day of actual trouble-free service.

Write for facts.

**BRUNNER MFG. CO.**  
Utica, N. Y.

*World's Largest and Oldest  
Builder of Garage Air Compressors.*

Utica      Cincinnati      Kansas City  
San Francisco

# BRUNNER

AIR COMPRESSORS

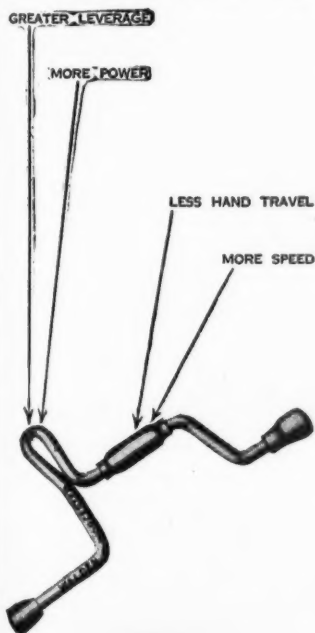




## TIRE CHANGES

with the  
**1500 SERIES**

**"BUY A GOOD RIM WRENCH BEFORE YOU NEED IT"**



Use this display board and this slogan—it will make your turnover as easy as the actual operation of this wrench.

You are always in a hurry to change a tire and the best wrench is then cheap at any price.

Here is the last word in Brace Socket Wrenches. It has the leverage and the speed. Will fit both rims and disc wheels. Speeds up work on the road or in the shop and what could be fairer than that.



**WALDEN-WORCESTER**  
INCORPORATED  
**WORCESTER MASS.**

**"Ask 'Em To Buy"**



Reg. U. S. Pat. Off.

## NON-SKID CHAINS

for Pneumatic Tires

**SELL EASILY  
and STAY SOLD**



The sale of Arrow Grip Chains for pneumatic tires doesn't end at your counter. They sell themselves more strongly every time they're used. Motorists, — women as well as men, — like the distinctive Arrow Grip

convenience features and tell their friends about them.

Handy fasteners make cross chain replacement a matter of seconds. A replacement that duplicates the original installation made right on the road without chiseling or clinching,—without taking chains from tires.

Every motorist is a prospect for Arrow Grip chains. Every chain user is a prospect for Arrow Grip Cross Chains and Fasteners.

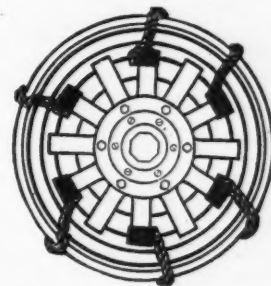
Mail the coupon for a sample length of chain showing the handy replacement fastener.

## ARROW GRIPS

for Solid Tires

Assure perfect traction regardless of road conditions.

Another Arrow Grip convenience device that makes a hit with truck drivers, truck owners and fleet managers. Two parts only,—a clamp that remains on the spoke and a short length of chain that snaps on instantly when needed.



**Arrow Grip devices bring gratifying profits**

*Ask Your Jobber*

## ARROW GRIP MFG. CO., INC.

106-126 Cooper St.

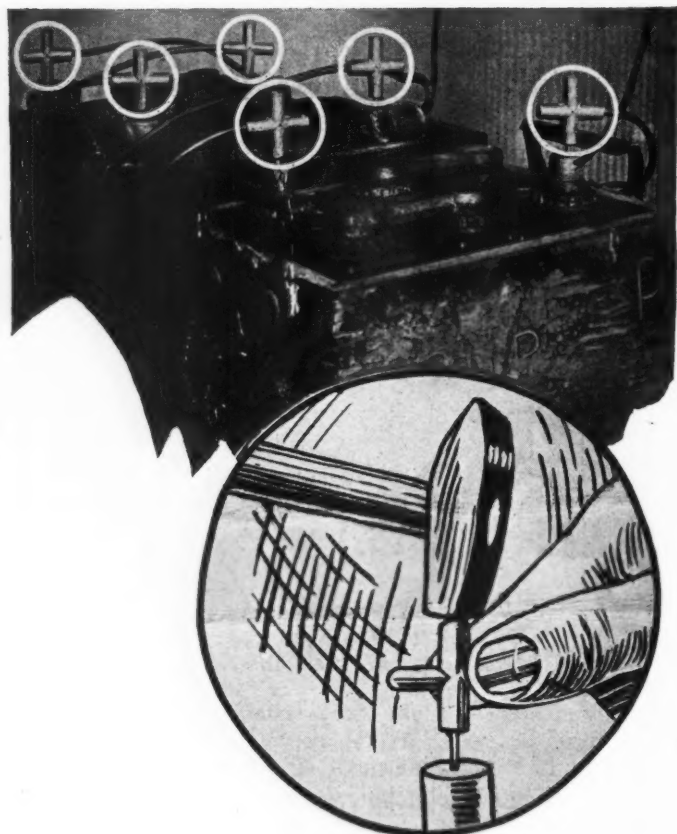
Glens Falls, N. Y.

Export Office: 280 Broadway, N. Y.

Arrow Grip Mfg. Co., Inc.,  
106-126 Cooper Street,  
Glens Falls, N. Y.

Send a sample of chain showing the Arrow Grip handy Cross Chain Fastener.  
Send me details about Arrow Grips for solid tires.

NAME.....  
ADDRESS.....CITY.....STATE.....  
MY JOBBER'S NAME.....



## A New—A Better Battery Connector

More than a Convenience — a Burton-Rogers NECESSITY in busy charging-stations where every moment must count.

A tap with a hammer securely anchors the SHURO into the battery—like a nail in a block of wood. A POSITIVE METAL-TO-METAL CONTACT.

Completely eliminates possibility of loose, high-resistance connections—always present with clips. When you want to remove it, a slight twist does it, instantly. Made to last for years—steel pins heavily lead-plated and hardened—acidproof. Each connector consists of two pins (crosses) and 15" of rubber-covered wire. Cost half that of clips. SHURO is replacing the ordinary clip connectors everywhere. Give them a trial.

# SHURO

## BATTERY CONNECTORS

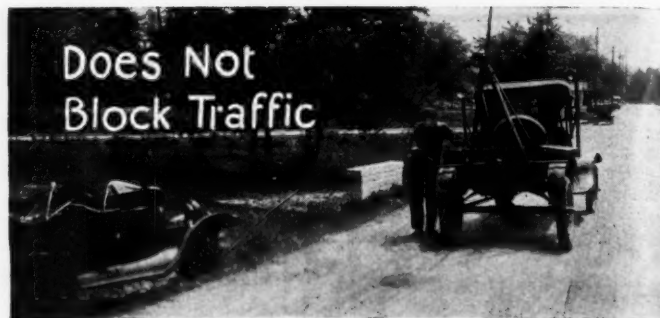
THE BURTON-ROGERS COMPANY

Sales Department—Hoyt Electrical Instruments  
755 Boylston St., Boston, Mass.

Hoyt Instruments may be purchased from your jobber.  
Branch Offices and Distributors in all principal cities.



"The Best Equipped Shop Gets the Business."



## Holmes Crane Type Wrecker

*The Swivel Head Permits a Straight Pull From Any Angle*

More than half the wrecks you handle are in positions hard to reach. Nearly all of them are on much-traveled roads.

You must have a wrecking crane that will reach anywhere without blocking traffic. Here it is.

The swivel head lets one man handle this wreck while plenty of room is left for passing cars. With a stiff-necked crane he would have to back across the road and block it completely. That would take time, make trouble, be dangerous, and call for another man or two to guide traffic while lifting the wreck.

With the HOLMES Crane-Type wrecker one man

drives to the side of the road, and in one straight pull, with only one hitch, and with the power of twenty-one men, lifts the wreck easily and quickly.

Then he couples it on to the Holmes adjustable tow-bars, and safely hauls it over rough roads at 30 miles an hour.

**\$250 to \$500  
Monthly**

is being made by owners of Ernest Holmes wreckers.

You can make these extra profits with this wrecker. Many repairmen report that their Holmes Wreckers paid for themselves in a few weeks, then began returning big dividends.

**Ernest Holmes Co.  
Chattanooga,  
Tenn.**

Winch without block in cable multiplies power 21 times. Gives 40 to 1 increase with block.

Gears machine cut of steel and bronze.

Full floating drive shaft in bronze bushings. Crank fits both ends.

Strain of cable falls on extra heavy tube-axle, relieving drive shaft of bending stresses.

Long sills distribute stress all over frame of car.

Can be equipped with electric drive in ten minutes at moderate cost.

Adjusts to four positions without weakness.

Permanent handle on second gear quickly adjusts length of cable.

Whole controlled while standing on ground in one spot.

No climbing in or out.

Profits running from \$100 to \$500 easily made.



SAMUEL T. FREEMAN & CO.  
1519-21 Chestnut Street.

AUCTIONEERS  
Philadelphia

## RECEIVERS' SALE IN EQUITY

In the District Court of the United States for the eastern district of Pennsylvania. In equity. December sessions, 1922. No. 2685.

### VALUABLE PLANT of THE DANIELS MOTOR COMPANY at READING, PA.

Thursday, October 4th, 1923,  
at 10 A. M.

### On the Premises

**Real Estate**—Four story brick "U" shaped Factory, with power plant, elevators, railroad siding, large suite of offices and lot 176 $\frac{1}{4}$ x229 $\frac{3}{4}$  feet; with frontages on the Reading Railroad, Third Street and Thorn Street. Also lease on the first floor of the adjoining property.

**Service Rights and Good Will**—Consisting of large and valuable assortment of parts for repairs of cars on the road, patterns, patents, special jigs, dies and tools, right to receive mail, etc.

**Machinery and Equipment**—Comprising modern machine shop recently equipped with Cincinnati plain and vertical millers, Walcott, Lodge & Shipley Lathes, Beckford radial drills, Heald grinders, Garvin profiler, Moline hole hog, Brown & Sharpe universal grinders, Bullard turret lathe, Brown & Sharpe hobber, Gould & Eberhardt shaper, generator sets, motors, etc., blacksmith shop, small tools, nickel plating outfit, wood working equipment, including tenoner, boring machines, dado machine, shapers, jointers, planers, saws, etc. Metal working equipment, including hammers, saws, grinders, polishing lathes, air compressors, etc.

**Stock and Fixtures**—Comprising sheet steel and aluminum nuts, bolts, lumber, leather, upholstering materials, large number of bodies, some completed and some partially completed, also office equipment, oak and mahogany; typewriters, adding machines, calculators, etc.

By order of C. VERNON BRADFORD, } Receivers.  
GEORGE C. TENNEY, }

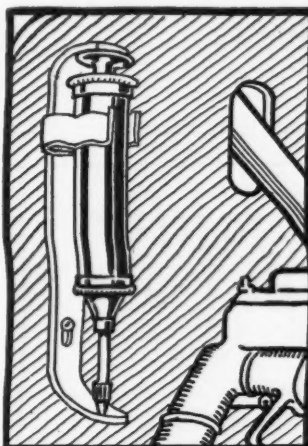
MORGAN, LEWIS & BOCKIUS, Attorneys for Receivers,  
934 Land Title Bldg., Philadelphia, Pa.

Terms, full description of property and itemized list of equipment in catalogue, which will be mailed upon application to

**Samuel T. Freeman & Co., Auctioneers,**  
1519-21 Chestnut Street, Philadelphia, Pa.



## Lubricate the Chassis with HEAVY OIL!



### Carry it under the Hood!

The big advantage of the SAAL system is it's so easy to use, you actually use it! Makes chassis lubrication a white-collar job with service station results. Steel holster supplied free so you can carry the SAAL OIL SHOOTER under the hood, ready for instant use!

Use the "SAAL OIL SHOOTER" and HEAVY OIL to lubricate steering, shackle and other chassis bearings. Cleaner, and quicker, easier and better lubrication! "Makes cars ride better and last longer."

\$  
**4**

FOR CARS AND TRUCKS

SAAL OIL SHOOTER for big cars and trucks. \$8 for complete outfit including fittings. Fittings 10c and 15c each.

\$  
**3.50**

SAAL OIL SHOOTER for Fords, Stars, Overland. \$5 for complete outfit, including fittings. Fittings 5c, 10c and 15c each.



## SAAL Heavy Oil System of Chassis Lubrication

### Does the Job in 5 minutes!

It only took 52 seconds to completely lubricate a test car of NASH at Kenosha. You can do the job in 5 minutes or less, keep your hands clean, your clothes unspotted, and your temper serene! You can do a better job, because HEAVY OIL is 4 times as efficient a lubricant as grease! If your dealer cannot supply you, order direct from the manufacturers, stating make and year of car. Send no money, we ship C. O. D.

#### DEALERS!

Write for literature and our big-dealer profit-offer.

#### SALESMEN!

Here we believe is the greatest selling opportunity in 10 years. Get our proposition quick!

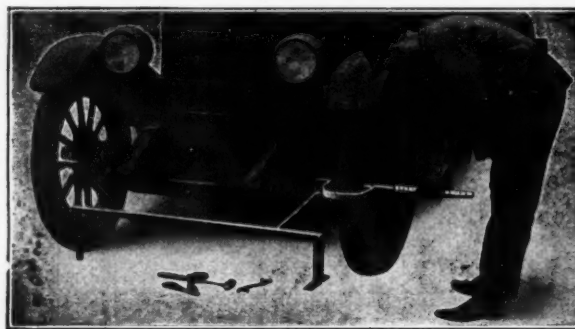
**H. G. SAAL CO.** Established 22 years  
Dept. 270  
1800 Montrose Ave., CHICAGO

"Makes cars ride better and last longer"

## Something you have always Needed—

A test made on twelve cars parked along one side of a street revealed the fact that **ON TEN OF THEM THE WHEELS WERE FROM  $\frac{1}{4}$ " to  $\frac{1}{2}$ " OUT OF LINE.** When they are out a great deal, you can tell it—when they are out only a little, **YOU CANNOT TELL IT WITHOUT A GAUGE.** A good way is to have a **MANLEY GAUGE** handy and check up front wheels. When out, you will get the job to correct them. And your customer will appreciate your interest in his car.

**Manley Manufacturing Co.**  
York, Penna.



## this MANLEY Wheel-Aligning Gauge

is read **FROM THE OUTSIDE** where reading is easy and the mechanic can be accurate. (Don't compare this gauge with any that reads on the **INSIDE**.)

The feet of the **MANLEY Gauge** are adjustable to the correct diametrical line for all tires, 30" to 36". **DROP Frame** avoids springs, flywheel, oil-pan, etc., when placed at rear of wheels. Made entirely of steel.

The price—just \$9.50, which is about what you should make **EACH WEEK** in aligning the wheels you find **OUT** with it. Some investment. Buy it from your jobber. Complete catalog from us.

## Dover Automatic Measuring Can

*Used by all the leading sealers  
throughout the country*

**Correct Self Reading—Saves Time—  
Prevents Errors**

PAT. MAY 10, 1921



Calibrated in cubic inches showing at a glance the errors and the correct amount **over or under.**

Eliminates use of Glass Graduate in determining variance or error of Gasoline Measuring Pumps at a glance. The gauge is adjustable and removable and can be sealed when properly set.

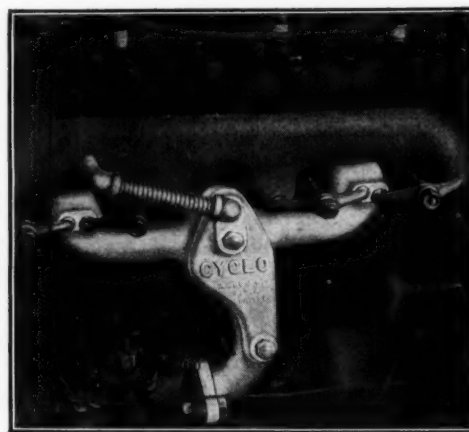
All the large Garages are buying these Test Cans so they can tell at a glance whether or not their Gasoline Pumps are correct.

Almost every Sealer of Weights and Measures in our own State has a complete set of these Measures so that he can test each pump accurately.

**DOVER STAMPING  
& MFG. CO.**

385 PUTNAM AVENUE  
CAMBRIDGE 39, MASS.  
U. S. A.

## Other Cars Have Hot-Spots— Why Not the Ford?



You can build a permanent and profitable business selling a vaporizer suited to the unique requirements of the Ford power plant.

### The CYCLO "Dynamic" Hot-Spot

completely answers this need, with a growing record of fine results.

We would like to tell you about the remarkable smoothness, economy and power developed by the use of this "Modified Vapor" System.

We will quote you terms that make it worth while to handle the CYCLO.

**CYCLO MANIFOLD COMPANY**  
High and Chestnut, Akron, Ohio



# Selling trucks and buses is easier when you know the owner's viewpoint

## Read Motor Transport

It tells you the problems of the Fleet Owner. It tells you how Fleet Owners are making and can make a success of truck or bus operation.

Just as *Motor Age* tells you how to handle your business, so *Motor Transport* tells how to efficiently operate fleets of motor trucks and buses.

Reading *Motor Transport* will make you a better dealer.

Recommend fleet owners to whom you have sold trucks or buses to subscribe for *Motor Transport*. This magazine will make them more efficient operators.

You will both benefit!

*Motor Transport* is published semi-monthly, on the 1st and 15th. The subscription price is \$2.00 per year (\$2.50 West of the Mississippi).

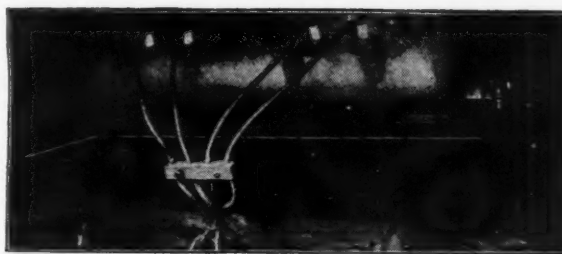
Write for a sample copy.

# Motor Transport

FORMERLY COMMERCIAL VEHICLE

(Published by the Class Journal Co.)

239 West 39th St. New York, N. Y.



Showing installation on Dodge Car—One of sixty different models.

## More Heat— Quicker Heat

The Francisco Auto Heater gives from two to three times the amount of heat obtained from any other heater. It gives it quicker—after the car has been driven three or four squares. It gives it at a lower speed—from ten to fifteen miles per hour.

It performs equally well in a closed or open car. It is a real boon to the man who must drive an open car in the winter. It is simple in construction and can be installed in an hour.

The Packard, Maxwell, Chalmers, Lexington, Stutz, Rickenbacker and Columbia have adopted it. On the Rickenbacker it is standard equipment on both open and closed cars.

Sixty different models are made to fit every make of popular cars. Prices range from 1/3 to 1/2 less than those for any other exhaust heater on the market. Some of the list prices are:

Ford .....	\$2.50	Buick .....	\$10.00
Maxwell .....	7.50	Dodge .....	7.50
Star .....	5.00	Overland Four....	7.50
Chevrolet .....	5.00	Studebaker .....	10.00
Gray.....	\$5.00		

All six cylinder cars are listed at \$10.00

Write us for dealer's discounts.

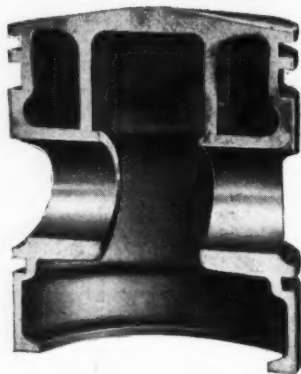
Address Dept. DA-1

## Francisco Auto Heater Mfg. Co.

Columbus, Ohio

## Aluminite Pistons

*Wear five times longer than die-cast pistons. They will not score, pump oil or slap. These Ribs carry heat away and prevent preignition. In use in 90 per cent of the successful racing motors. Weigh only one-third that of cast iron. Make a good four perform like a six. The result of nine years of successful operation. Used by winner of Pikes Peak Race. A combination of right alloy and right design. The one great replacement for all makes of cars. We also make Aluminite connecting rods. Special prices.*

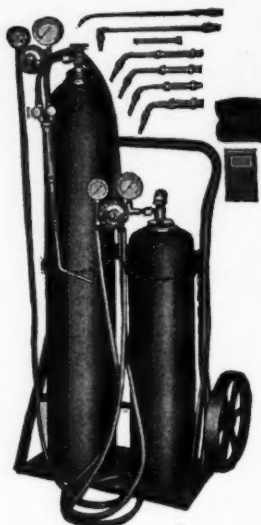


## High Speed Camshafts

Replacement for all makes of cars. Permit higher speeds and give any motor more power. Tests prove this. A quality replacement at a low price. Replacement list, prices and discounts sent on request.

**GREEN**  
ENGINEERING CO.  
DAYTON, OHIO

## Smith Portable Welding and Cutting Outfit



Inexpensive equipment especially designed for the shop not doing sufficient welding to warrant purchasing acetylene generator or plant. There is a surprising volume of light welding work that is easily turned into extra profits by the shop equipped with a Smith Portable Welding and Cutting Outfit.

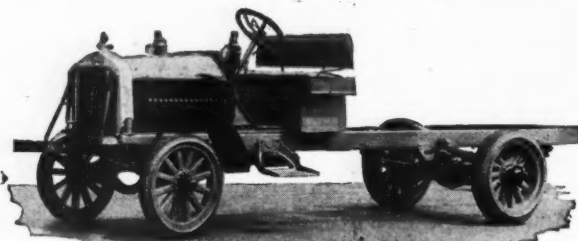
Write us for illustrated catalogue and information on extra money for you in welding work.

Ask your jobber or write for illustrated catalogue

Exclusive  
Manufacturers  
of  
Welding and  
Cutting Equipment

**SMITH'S  
INVENTIONS  
INCORPORATED**  
Minneapolis

## MASTER TRUCKS Balanced Oversize



**SPEED MASTER— $\frac{3}{4}$ — $1\frac{1}{4}$  ton**

Highest Achievement for fast freight transportation

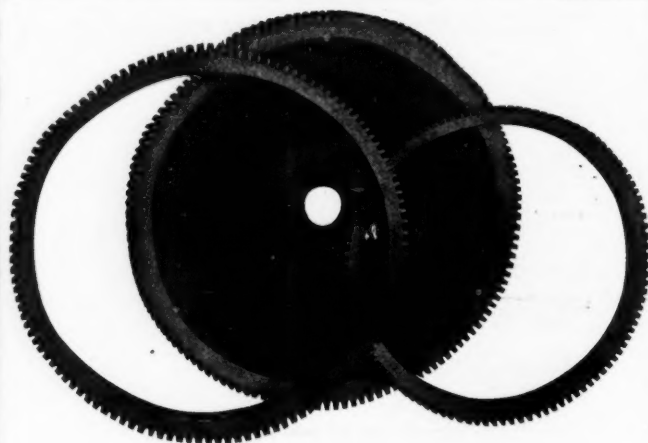
**HEAVY DUTY MODELS— $1\frac{1}{2}$  to 6 ton**

A revelation to Motor Truck Buyers

Highest grade recognized standard units used throughout. Built by a responsible Company of unquestioned financial stability.

Valuable Territory Open to Responsible Dealers

**MASTER MOTORS CORPORATION**  
2381-2399 Archer Ave. Chicago, U. S. A.

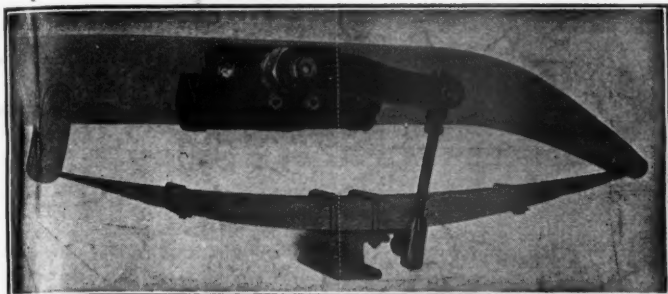


## New Low Prices On Fly Wheel Rings

Increased quantity production has enabled us to get out a new and lower price list on Meachem Steel Gear Rings for Fly Wheels. Also our trade discounts have been increased to more than offset the lower list prices. Write us for the new list and discounts.

**The Meachem Gear Corp'n.**  
Ring Dept. Syracuse, N. Y.





## 2WAY HYDRAULIC SHOCK ABSORBERS

(formerly called the Hydraulic Spring Control)

That our fundamental idea of controlling the springs—not to prevent their action—was correct, is shown by the success of our product.

A double-headed piston, its action governed by the pressure of oil, allows full spring flexibility, yet prevents violent road shocks. The more severe the shock, the greater oil pressure to minimize the action on the car body.

### More Than a Shock Absorber

Easy to install, long life (all working parts in oil), and unusual record of service, make the 2-Way Shock Absorber an exceptional proposition for live dealers.

Full details upon request.

**AUTO SPRING CONTROL CO.**  
Jamestown, New York



## PRACTICAL—ACCURATE



Five adjustable patented bushings make the Eagle Aligning Fixture the only *universal* device on the market. Their design makes it possible to align all rods with bearings from  $1\frac{3}{8}$ " to  $2\frac{3}{8}$ " in diameter.

With the Eagle you can detach and correct the slightest bend or twist in the rod or crooked hole in the piston. Every repairman will appreciate the saving of time effected by the Eagle Aligning Fixture, which is designed for actual approved shop work.



Sold through Jobbers.  
Information on request.

**EAGLE MACHINE CO.**

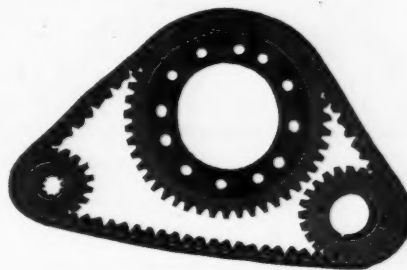
24 N. Noble Street,

Indianapolis

## "WHITNEY"

LONG SERVICE CHAINS HIGH MILEAGE  
SILENT TYPE

Never Skip the Sprocket Teeth



Unrivalled for Great Mileage

**THE WHITNEY MFG. CO.**  
HARTFORD, CONN.

New York	Boston	Philadelphia
L. C. Biglow & Co., Inc.	George C. Steil,	R. J. Howison
243 West 55th Street	200 Devonshire Street	624 Race St.
San Francisco, A. H. Coates Co., 770 Mission St.		

## KEYSTONE THE GENUINE



INITIAL RADIATOR CAP

## Quality

**T**HE Keystone Radiator Cap will outlast the life of your car many times. It is the result of many years of engineering effort and there are many features of construction not found in any other cap. No cap so well sets off the front end of your car.

Die cast, beautifully finished, rust-proof, water and steam tight. Cannot stick or freeze and radiator fills without removing or turning cap.

Distinctive initial or emblem plates furnished in aristocratic design and finish. Made to fit all cars.

The Keystone Jr. functions similarly except designed especially for Ford, Gray, Star Coupe and Chevrolet 490 cars.

Minimum investment carries sufficient stock—quick turnover—liberal proposition for dealers. Write.

THE NORLIPP COMPANY

568 W. Congress St.

Chicago, Ill.





Extra Brass-  
lets: 90 cents  
per box of  
1,000.

### The No. 230 Elm City Terminal Outfit

Complete  
Set  
\$1.80

—eliminates the tedious, old fashioned method of soldering on terminals for wiring jobs; and losing ten minutes' time with each operation.

It is simply a case of removing the insulation from the wire ends, splitting the cable, twisting the wire around brasslet—and operating punch. The entire job is done in less than one minute.

Send for a stock of Elm City Terminal Outfits. Each outfit consists of 1000 brasslets, and an eight inch nickel-plated punch. Dealers: Order from jobber, or order direct, mentioning jobber's name.

The C. S. Mersick & Co.  
274 State St., New Haven, Conn.

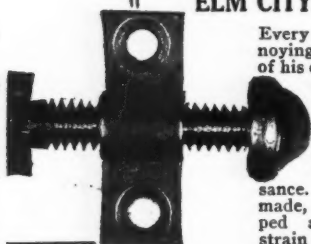


### ELM CITY Window Anti-Rattlers

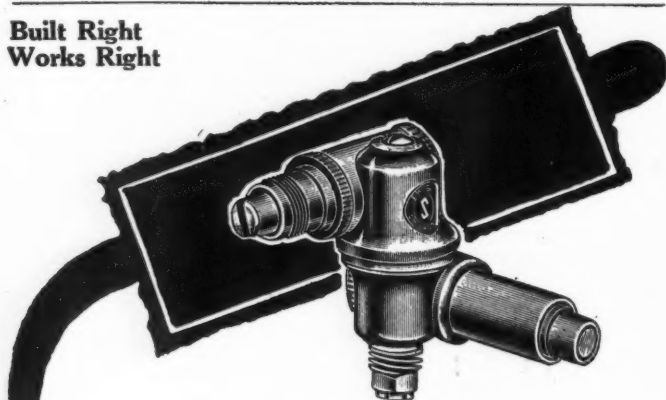
Every motorist knows how annoying it is to have the windows of his car rattle excessively. And this continuous vibration in time weakens the window holdings so that damage may result.

Elm City Window Anti-Rattlers prevent this nuisance. They are strong, well made, nickel-plated, rubber tipped and will withstand any strain or vibration.

Their obvious advantages insure quick sales and rapid turnover. Write for details.



Built Right  
Works Right



100% Accurate

### Circle "S" Swivel Joint FOR SPEEDOMETERS

You can't go wrong on a stock of Circle "S" Swivel Joints, because every one is thoroughly tested for 100% accuracy before it leaves the factory. It is accurately made to deliver accurate results and—does. Its unusual sale proves it.

Something for the Car for Christmas

**F. W. STEWART MFG. CORP.**

356 W. Huron Street

Chicago, Illinois

Manufacturers of the well known Circle "S"  
Automatic Windshield Cleaner.

Write Us Today for Full Details



### It's Good to Use Or Sell

Many jobbers and dealers in the automotive trade conduct garages or service stations. They find Brookins Measures mighty good to sell.

The flexible metal nozzle and the thumb valve are advantages that you can appreciate at sight. Convenience, time-saving and oil-saving are obvious.

Use it yourself. And don't neglect the generous profit that you'll find in its sale.

Write today for sample and trade prices.

The Brookins Mfg. Co.,  
192 Bayard St., Dayton, Ohio

Export Office, 11 Broadway,  
New York City. Cable Ad-  
dress "Brookins" New  
York. All Codes Used.

**Live Representatives  
Wanted**  
with headquarters in  
St. Paul and Minne-  
apolis. Must have a  
sales organization.

The Brookins Measure is made in one-quart, two-quart and gallon sizes, all copper finished. All sizes have the flexible metal nozzle that reaches any oil intake without the use of a funnel, and the thumb valve that controls the oil flow instantly and positively. These are distinctive Brookins features.

**Brookins**  
OIL MEASURE

## Never before

has there been such a chance to sell traffic signals as there is today.

With less than 20% of all cars, not including Fords, equipped with traffic signals, you should be able to sell GLOBE Traffic Signals profitably.

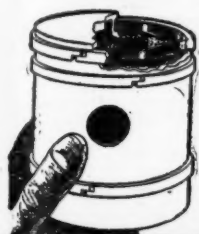


**The Globe Machine & Stamping Co.**

Cleveland, Ohio

World's Largest Producer of Traffic  
Signals, Tool and Battery Boxes.





**INSTALL**  
**Genuine APEX**  
**INNERINGS**  
**NOW at 20c**

**GENUINE**  
**APEX INNERINGS**  
(INSIDE PISTON RINGS)

Double installation business at the new 1/3 reduced price. Millions of Genuine Apex Innerings are now in service to

**STOP OIL PUMPING and PISTON SLAP**

for hundreds of thousands of owners of every type of gas engine; auto, truck, tractor, marine, light plant, stationary. Not only are they guaranteed to do this, but they eliminate vibration, fouled plugs, increase power, compression and ESPECIALLY economy of operation.

**NEW RETAIL PRICE ONLY 20c EACH**

up to 3/8" wide or 5" diam. Larger 35c. (Formerly 30c and 50c). Dealers: Order from your jobber today or write us. Jobbers: Write us today for new attractive proposition.



**DATED**  
Insist that you get only the  
Genuine bearing our Guarantee  
Tag.

**THOMSON-FRIEDLOB MFG. CO.**

Peoria, Dept. C, Illinois

# Johnson

## Bushings

**Buy Them From Your  
Jobber's Salesman**

The 135 page Johnson Catalog is the first book ever compiled from which the dealer or repairman can intelligently order his complete bushing requirements without duplication of sizes.

These catalog pages are made loose leaf to fit the standard binders of Jobbers' salesmen and are carried by representatives of the leading jobbers.

Ask your jobber's salesman to show you his Johnson Catalog sheets.

**Johnson Bronze Co.**

New Castle, Pa.

**DE LUXE**  
Products  
For the Motorist's Comfort

Always on the job  
"when a feller  
needs a friend"

Only \$3.50 Retail

**ORDER DIRECT  
SPECIFYING  
JOBBER**

*The*  
**DeLuxe**  
TIRE PUMP

Also  
ARVIN HEATERS  
DE LUXE.  
DE LUXE VENTILATORS

**INDIANAPOLIS PUMP & TUBE CO.**  
INDIANAPOLIS

## UNIVERSAL Hose Clamp

*Adjustable to fit any hose of any size*  
**Used by the Trade for years**

Two sizes cover all jobs. Senior 1 to 3 inches. Junior 1/4 to 1 1/2 inches. Any job, from 1/4 inch up to any given diameter, taken care of in a few minutes by this adjustable clamp. Universal Hose Clamp is made from tough bands of cold rolled ribbon steel with rounded edge. Cannot cut hose. NOT heat treated but

electro-galvanized. Scores between holes makes clean, quick break-off of any overlap. No jagged ends. Bead in clamp provides for pressure that makes Universal Hose Clamps permanently **LEAK PROOF** once they're attached. Order from your jobber today. 50 to the carton. Order by box or carton.

Universal Adjustable Hose Clamp Made only by:

**UNIVERSAL  
INDUSTRIAL  
CORPORATION**

**HACKENSACK  
NEW JERSEY**

Trade Mark Registered

**Look for our name on every clamp**

**Always Look For  
The Name  
ROBERT BOSCH  
and this  
TRADE MARK**



## Compare Them— Feature for Feature!

No other Spark Plugs are in the same class with the genuine, *original* Bosch.

### Robert Bosch Spark Plugs

Valve seat principle—Stea-  
tite core—perfect insulation.  
Secure our attractive Dealer  
proposition at once.

**Robert Bosch Magneto Co.,  
Inc.**

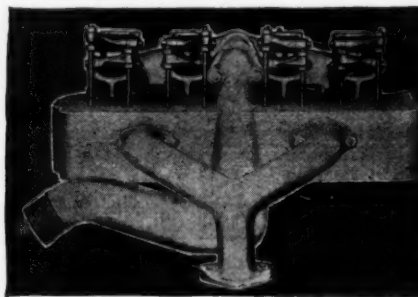
Otto Heins, President  
123 West 64th Street New York  
Chicago Branch:  
1302 South Wabash Avenue  
Service Stations in All Principal  
Centers

The Genuine, *Original* Bosch means  
Robert Bosch only



Two-Piece  
Plug  
Easily  
Taken  
Apart for  
Cleaning

### ROOF 16 OVERHEAD VALVE EQUIPMENT For Ford and Dodge Motors ROOF 8 VALVE HEAD FOR FORD MOTOR



**Stupendous Power—  
Lightning Speed**

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete — ready for installation — no machine work necessary. We are headquarters for all speed equipment. No matter what you want, write us. Racing quality — lowest prices. A postal card brings you complete list of our specialties.

Jobbers—Dealers—Consumers—Write Us  
**THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA**

## New Departure Ball Bearings



**See Here!** You can make \$75 to \$125 a week!

**I GUARANTEE**

to prepare you to go into business for yourself, to hold down any AUTO EXPERT'S job at \$300 to \$500 a month. I guarantee to help you step out of the "mechanic" class quick—or to refund your money!

**NOW you can learn at HOME**  
As Directing Engineer of the big CHICAGO AUTO SHOPS I know the short cuts, the practical methods, that make a man worth \$100 a week instead of \$25. I train you at HOME—in your spare time. I give you a complete training—Mechanical, electrical, battery, tire, welding—everything!

**Go into business—make \$5,000 to \$15,000 a year**



## Be An Auto EXPERT!

Learn to  
do Any  
Job



The Cooke-trained expert has learned how to find the trouble instantly and repair it quick!

### START NOW!

Make up your mind you're going to get a share of the millions of dollars paid out each year to keep autos, trucks and tractors going! Prepare for that Expert's job—for that business opportunity NOW! My free book tells you how others have found my course the quick, easy way to success. Write today!

### FREE!

\$18.50 Repair Outfit given free if you enroll at once! "Learn with tools" — says B. W. Cooke. Use this outfit to make the course pay for itself!

Directing Engineer B. W. Cooke  
**CHICAGO AUTO SHOPS**  
Dept. 107, 1553 W. Madison St. CHICAGO

### Dealers and Distributors Wanted TO SELL

**WOLLO SPARK PLUGS**

Pack them full of oil or grease, they'll fire. Keep down carbon—save gasoline.

Write Us Today for Selling Proposition



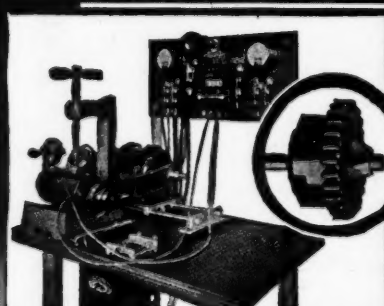
Fires longer in that oil pumping cylinder.

**WOLLO**

3328 Olive St.

St. Louis, Mo.

### EXCELSIOR TEST BENCH With the Positive Drive and Speed Control



#### INCREASE YOUR PROFITS!

Starting, lighting and ignition pays bigger profits than any other branch of automotive service.

#### The Excelsior Test Bench

equips your shop complete for this work.

**Price \$385.00**

Payable \$50 per month

Write for bulletin 975M

**WEIDENHOFF** 4350 ROOSEVELT ROAD CHICAGO, ILL., U.S.A.



## SAVE TIME WITH *The Cincinnati* "Junior"

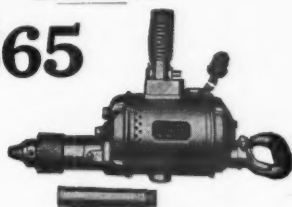
PRICE **\$28**



**1/4" PORTABLE ELECTRIC HAND DRILL  
BALL BEARING - - WEIGHT 5 LBS.**

Pistol Grip with Automatic Switch. "Stream" Line design for close corner work. All-aluminum Motor Frame. Bench stand, mandrel with emery wheel or buff, furnished if desired.

PRICE **\$65**



**1/2" "SPECIAL" DRILL**

**BALL BEARING - - UNIVERSAL MOTOR .**

Powerful, durable, compact. Combination Bench Drilling Stand for use with this drill. Price, \$24.00.

**A complete line of Portable Electric Drills, Grinders and Buffers. Send for Catalog.**

**THE CINCINNATI ELECTRICAL TOOL CO.**

**1515 Freeman Ave., Cincinnati, Ohio**  
 New York Seattle  
 50 Church St. 1115 Federal Ave.  
 San Francisco 1220 Real Estate Trust Bldg.  
 918 Hearst Bldg. Los Angeles  
 510 Equitable Bldg.

**BROWNBILT  
SOCKET WRENCHES**

## Service Selections that save the Repairman's Time

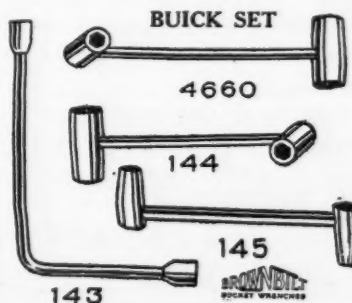
Time is saved on every overhaul job by having the right wrench assortment handy. With the Brownbilt service selection, there's no need to scout around the shop for wrenches and try half a dozen before you find the right fit. Both symbol number and size are plainly marked on each wrench.

Brownbilt Service Sets are available for Ford, Buick, Maxwell, Dodge, Overland and Chevrolet cars.

All Brownbilt Socket Wrenches are high quality—the perfected result of nearly 15 years of wrench building. Write for catalog.

**The Brown Co.**

**Syracuse, N. Y.**



Buick service selection list \$3.80.

Reaches all important nuts and cap screws.

Valuable for your own service use and also for selling in accessory department.

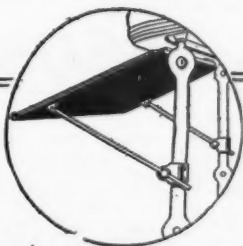
## King of the Elements

Out in the rain, and the hail, and the snow—or the rays of the glaring sun, the Higgin gives its unflinching protection and is therefore a big seller in all seasons. Adapted to all cars, including Fords.

The Higgin is as durable as it is good looking. Made of 22-gauge cold

rolled steel and finished in hard baked enamel—black on the outside—green inside. The lower edge is turned up to form a gutter that drains water over the side of the car.

We protect your territory and give real merchandising assistance. Write for details.



Made by  
**The Higgin Mfg. Co.**  
Automotive Division  
Newport, Ky.

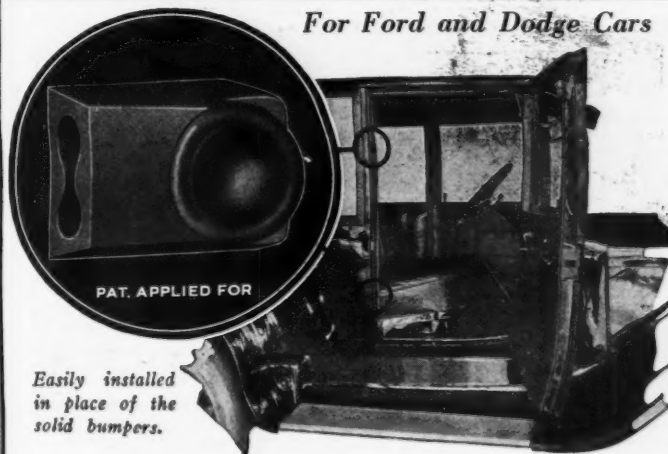
**Sells for  
\$3.50**

and nets a real  
profit.

# HIGGIN ALL-METAL VISOR

Installed in  
twenty minutes.  
The brackets are  
easy of adjust-  
ment and always  
stay put without  
rattling.

**For Ford and Dodge Cars**



Easily installed  
in place of the  
solid bumpers.

## No More Noisy Doors!

The vacuum cup of the Jorgensen Door Silencer absorbs the shocks of banging doors. These silencers grip the door and keep it closed snug so it can't rattle.

Moulded from tough but resilient black rubber.

Made especially for use on Ford Sedans and Coupes and on Dodge Sedans (all models) and Coupes (1922 or earlier). Special models for other cars will soon be available.

Dealers: Write for prices and complete information.

**Jorgensen Specialty Co., Erie, Pa.**

# Jorgensen DOOR SILENCERS

## Stop Hand-Scraping

In fifteen minutes you can shave and burnish a bearing to nearly 100% bearing surface, with hardly any effort and no trial fitting.

USE AN

## Elk Machine Tool

It also removes wrist pins, aligns and reams wrist-pin bushings, squares wrist pins, connecting rods and pistons.

We are now establishing distributing agencies. Good profits to hustlers.

**Elk Machine Tool Corporation**

243 West 17th Street, New York, N. Y.

## An Investment In Safety!



The New Duo-Convex, double convex spring bars with back bar reinforcement. Black or nickel. Prices \$15 to \$22, according to size and finish. Without back bar, for Fords and other light cars, \$12 to \$15.



The New Sport Duplex Model. Most beautiful bumper on the market. Black japan or nickel. Medium cars, black, \$14.50; nickel, \$16.50. Large cars, full nickel only, \$24.

The twenty styles of New Era Bumpers represent the ultimate in appearance and safety to car and driver. To the dealer they mean confidence and increased sales. The bumper that is best for drivers is clearly best for dealers. Let us think NOW about something for the car for Christmas.

Write for Catalog

**NEW ERA SPRING AND SPECIALTY CO.**

SMALLEY DANIELS, President

70 Cottage Grove Ave.

Grand Rapids, Mich.

Export Department, 130 W. 42nd St., New York City

## PARANITE CABLE

Best for Automotive Work

We carry at all times a complete stock of every kind of cable used for automotive work. Many years of specialization have brought **PARANITE** Cables to the highest state of perfection. The finest grades of rubber compound, cotton and flexible enamel varnish are used.



FOR 33 YEARS THE STANDARD  
IF IT'S **PARANITE** IT'S RIGHT  
Quality jobbers handle quality cable—  
that's **PARANITE**.

**Indiana Rubber & Insulated Wire Co.**

810 Marquette Bldg., Chicago

Factory and General Offices—Jonesboro, Ind.

Eight body types—\$1295—\$2250

## STEPHENS

Finer Motor Cars  At Lower Prices

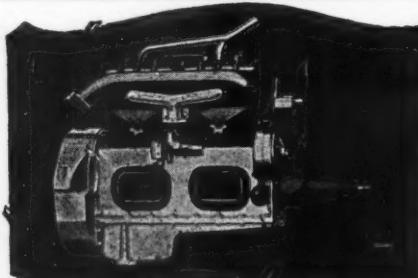
PERFECTION  
GEAR  
COMPANY

1475  
Michigan Ave  
CHICAGO

**PERFECTION**  
Silent Timing  
**GEARS**

SILENT  
DURABLE  
DEPENDABLE

WORLD'S  
STANDARD  
REPLACE-  
MENT



**A Better Motor**

The development of this new Waukesha Bus and Truck Motor is a long stride in "heavy motor" efficiency. Its low operating costs builds bigger profits.

Write for details.

**The Waukesha Motor Company**  
Waukesha, Wisconsin

**Waukesha**  
TRADE MARK

**BUS and TRUCK MOTORS**

## SKIVED PATCHES

CORD AND FABRIC

*Distributors Wanted*

**THE LEO MEYER CO., AKRON, OHIO**

Established 1914

## LINCOLN

FOR ALL CARS—\$15 to \$36

## SHOCK ABSORBERS

### NO-LEAK-O PISTON RINGS

Won't Leak Because They're Sealed With Oil



No-Leak-O Piston Rings are making money for dealers everywhere. Their "oil SEALING" groove—found only in No-Leak-O—packs an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell No-Leak-O by teaching the motorist the lesson of more mileage on less oil and gas. It will pay you to stock No-Leak-O at once.

Price 50¢ and up.

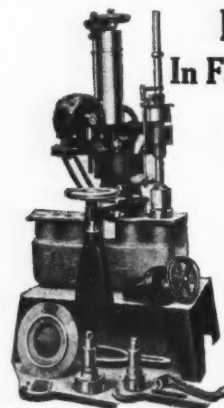
**NO-LEAK-O PISTON RING CO., Dept. T-57, Muskegon, Mich.**

## Make the Big Money In Fall and Winter Overhaul Jobs

Cylinder renewing offers the big money in fall and winter overhaul jobs. Are you equipped to keep this profit yourself?—or must you let it get away to others?

### Stormizing Machines

Will handle all your cylinder renewing. Will add a big profit to your winter shop jobs. Look into this better method of cylinder refinishing. Send today for our book: *Modern Cylinder Methods*.



**STORM MFG. CO.**

406 A Sixth Ave. So.

Minneapolis

## STEVENS TOOLS

SPEED  
UP



OVER 50 WONDERFUL SHORT CUTS  
IN NEW CATALOG T-105

ASK FOR IT

**STEVENS & COMPANY**

175 BROADWAY, NEW YORK



## A JOHNSON No. 300 Melting Furnace

Will melt 150 lbs. of soft metal quicker, cheaper and less trouble to operate than any type Furnace.

Does not require a forced air blast.

Installed instantly by connecting to city gas pressure and consumes only 40 cu. ft. of gas per hour.

Complete with Melting Pot—

**\$25.00**

Write for catalog of Gas Appliances.

**JOHNSON GAS APPLIANCE CO.**  
Cedar Rapids IOWA



No. 300

Send For Our

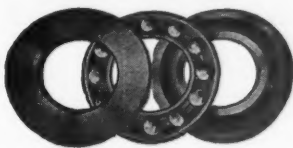
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Thrust Ball Bearings made to your B/P's.

Quotations made promptly on all inquiries.



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# 2 in 1

## TIMER

FOR FORD MOTORS

Pat. 2-15-16. 4-23-22.

The ever increasing demand for the Turner 2 in 1 Timer for all Ford motors is proof enough of its merit. Ford owners and dealers everywhere are coming to recognize it as the first product in the timer field. It has stood repeated and rigid tests for over six years. Increases power, insures an instant start in all weather, lessens fouling of two front plugs, saves gasoline and stops motor "kicking." Is oil, grease and waterproof. Requires no oiling and is easily installed. Price complete, \$3.60. Ask us about the Turner Junior Timer and the complete Turner Line of automotive devices.

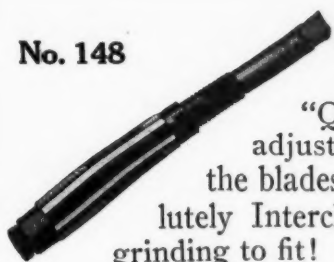
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No. 148

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Adjustable Reamer



"Quick-Set" is the only adjustable reamer made the blades of which are Absolutely Interchangeable — without grinding to fit!

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TRADE MARK REG. IN U. S. AND FOREIGN COUNTRIES

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Positively Grinds valves in  $\frac{1}{4}$  usual time and guarantees a better job. Can be operated at 4,000 r.p.m. Fits any electric drill or hand drill. Absolutely NO VIBRATION. Weighs 8 ounces. Easily reaches rear cylinder of Fords. Price \$5. Get details from us or from any electric drill manufacturer.

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557 W. JACKSON BLVD.

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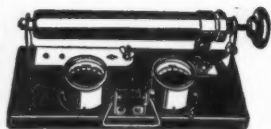


**\$28.00**

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**TEST YOUR BATTERIES**

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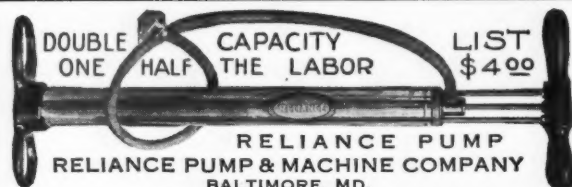
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**ADCO WINDSHIELD WIPERS**

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A Type and Price for Every Customer

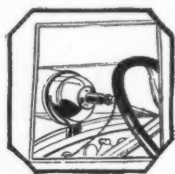
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DOUBLE ONE HALF CAPACITY THE LABOR LIST \$4.00

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Pat. "It Cleans While You Drive"

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THE NEW EMPIRE DISTRIBUTION PLAN enables dealers to make extra profits on these well known super-standard casings and tubes.

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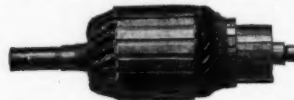
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make well equipped  
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Fast and ACCURATE for re-facing, reseating and grinding all size valves.

Sioux Flexible Shaft and Attachments take the tool to the work.

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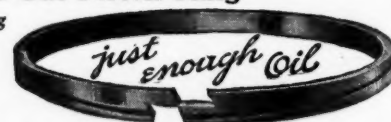
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With the Wandering

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Reduces discomforts of hot-weather driving. Distributors wanted. Write for territory now.

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If your jobber cannot supply you with RED GIANT RIM TOOLS do not accept "something just as good" but order direct and send us your jobber's name and address. Dealers price, \$3.25.

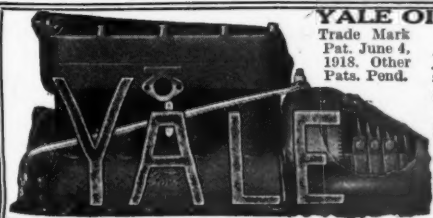
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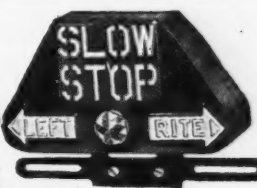


Saves battery, lights, and generator. Guards charging line, cutout and ammeter. The details of this fast selling necessity will interest you. So will the price.

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Universal Joint Ball Cover for Fords  
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"Bay State" Wrenches

Cold-Drawn Sockets

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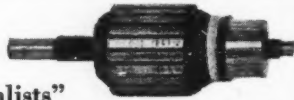
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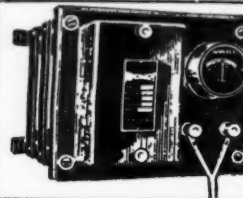
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**VULCAN**  
The Replacement Spring**JENKINS VULCAN SPRING CO.**

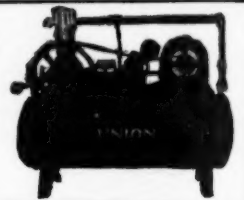
Factory: RICHMOND, INDIANA

BRANCHES: Boston, Mass., 819 Boylston St.; Dallas, Tex., 2216-18 Commerce St.; St. Louis, Mo., Main and Cedar Sts.; San Francisco, Cal., 1085 Polk St.

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Union Equipment Co.  
Butler, Pa.



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Our Cylinder  
Internal and  
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**Grinders**

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MACHINE CO.  
61 New Bond St.  
Worcester,  
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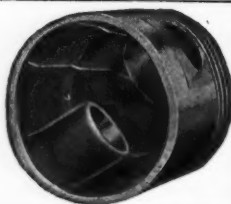
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Sensible Lightweight Pistons  
Make the Miles Cost Less  
Lighter in Weight, More in Power than ordinary factory pistons. 147 models to select from

FOSTER-JOHNSON REAMER CO.  
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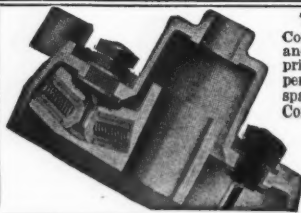


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Kokomo Long Life tires and tubes make money for dealers who handle them.

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Combines the "wipe" and "roll" contact principles. Gives full, perfectly synchronized spark at all speeds. Contacts are positive and unsealing. A wonderful dealer proposition. Write

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FOR FORD CARS TRUCKS & TRACTORS

The  
Utmost  
in Hoisting  
Efficiency

**WRIGHT**

Lisbon, Ohio, U. S. A.

**WRIGHT**  
**HIGH SPEED**  
**HOISTS**

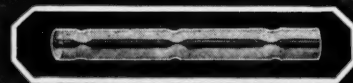


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Largest Auto Wreckers in the Country  
Grant and Water Sts. Pittsburgh, Pa.  
Mail Orders Given Prompt Attention

### AUTO PARTS

Nearly 3,000,000 Auto Parts.  
Why buy new parts, when we can  
SAVE YOU 50% to 75% off list?  
Parts for all models, Maxwell, Overland, Studebaker, from 1910 to 1920, and others.  
EUREKA AUTO PARTS & TIRE COMPANY  
334 N. Capitol Ave. and 503 N. Illinois St.  
Indianapolis Indiana

### WICHITA AUTO WRECKING CO. "The Old Reliable"

Offers you quick service, quality parts and absolute satisfaction,—and our prices are a little lower. We are an old reliable house and all that implies. Our stock of parts is one of the largest in the country—from a 1907 one cyl. Reo to a 1921 Overland Four.

Wichita GIVE US YOUR NEXT ORDER Kansas

### LAMMERT & MANN CO. 315-21 N. Wood St. CHICAGO

ESTABLISHED 1894  
EXPERT CYLINDER AND CRANKSHAFT RE-GRINDING

SPECIAL LIGHT WEIGHT  
CAST IRON PISTONS

PISTONS—RINGS—WRIST PINS  
SCORED CYLINDERS REPAIRED

### BOSCH MAGNETOS

GENUINE GERMAN BOSCH MAGNETOS, enclosed type, with platinum points, at a sacrifice. At the rate these magnetos are selling, we expect to be sold out within 30 days.

OUR PRICE	LIST PRICE
ZH6 \$18.00	\$ 60.00
ZH6 15.00 (M14)	60.00
ZR4 (2 spark) single	\$30.00 100.00
ZU4 (2 spark) dual	35.00 100.00

These are brand new and packed in the original cases.

Order at once as they are going fast.

WRITE—WIRE—or PHONE No. 3-5972

Special price if bought in quantity. How many can you use?

CONN. AUTO PARTS CO.  
36 Morgan Street, Hartford, Conn.

### PARTS FOR ALL MAKES OF CARS

Immediate service is our motto. Out of town orders shipped the same day they reach us. Full supply of all parts for all cars ever made. Complete line of new and used accessories. Satisfaction guaranteed. Send deposit with order, and specify clearly name, year and model of car. Send part if possible.

### TRIO AUTO-PARTS & TIRE CO.

2118-2120 S. Wabash Ave. Chicago, Illinois  
2012-2014 S. State St.

REBUILT AND NEW ELECTRIC MOTORS, GENERATORS and transformers, all standard makes, sold, bought and exchanged. Our rebuilt motors stand every test of new motors; 8000 always in stock; send for stock list. Write what you want or have to sell.

FUERST-FRIEDMAN CO., Ohio  
Cleveland,

### PATENTS

BOOKLET FREE HIGHEST REFERENCES  
PROMPTNESS ASSURED BEST RESULTS  
Send drawing or model for examination  
and report as to patentability  
WATSON E. COLEMAN, Patent Lawyer  
624 F Street N. W., Washington, D. C.

### Attorney-at-Law and Solicitor of Patents C. L. PARKER

Formerly Member Examining Corps., United States Patent Office

American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request.  
McGill Building, WASHINGTON, D. C.

### FOR SALE

Ford Agency and Garage in prosperous Penna. town in good farming and dairying community. Garage is modern and up to date, with all Ford equipment necessary. Storage for from 40 to 50 cars. Located on new improved road. One of the best paying propositions in this section. Will sell at inventory. For full particulars address,

Box E 6083, c/o MOTOR AGE, 5 S. Wabash Ave., Chicago, Illinois

Wanted: Garage equipment salesmen to sell nationally advertised article part or full time. Earnings average \$6 to \$30 daily.

Address Box E-6075, care Motor Age  
5 So. Wabash Ave., Chicago, Ill.

### Ford Truck Converter—\$100

Redden Truck Maker (consisting of frame and whole new rear) including wheels, tires and bearings, converts any Ford Car into a two-ton truck. A limited number at special bargain. Price \$100 each. Write or wire!

### LEVENE MOTOR CO.

2202 Diamond St., Philadelphia, Pa.

### AUTO INDUSTRY MAILING LISTS

Send to headquarters for dependable lists of Automobile Owners, Dealers, Accessories, Garages, Tire and Battery Stations, Truck Fleet Owners, Bus Lines, Taxicab Companies. Write for catalog and prices.

### MOTOR LIST COMPANY

403 Grand Ave. Des Moines, Iowa  
433 Howard St. Detroit, Mich.

ANY PART for ANY CAR NEW or USED  
Send for Catalogue  
Cincinnati Auto Parts & Wrecking Co.  
712-714 Walnut St.  
CINCINNATI, OHIO  
Parts our middle name

"No Leak O" Piston Rings, nearly all sizes, packed twelve in a box, any quantity at 50% off list, terms cash. Leather Fan Belts for Fords, \$12.00 per hundred.

E. A. BOWMAN, INC.  
41 Harper Ave. Detroit, Mich.

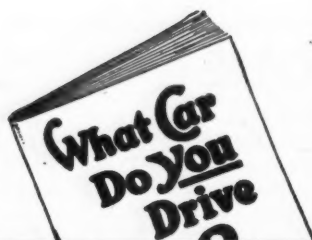
There is always a demand for expert rebuilding and repairing. If you are equipped to handle this class of work you should advertise in this section. For further information address Clearing House Department, MOTOR AGE, Mellers Building, Chicago.

### FOR SALE

1 Landis Piston Grinder; 1 Warner & Swasey No. 3 Fox Lathe; 2 Norton Grinders, 18x96 in. All machines in good condition. For further particulars, write

### THE BUDA COMPANY

Harvey, Illinois



## Just get the name of the car—

FOR A SELECTED KIT  
EVERY CAR



The Greatest Service  
From  
The Fewest Tools

look it up in "What Car Do You Drive," select the right Snap-on Kit listed for ready reference, and the sale is made. High quality tools and a sure-fire selling plan make Snap-ons a big-profit line for you. Write today for further details.

Motor Tool Specialty Co.  
14 E. Jackson Blvd., CHICAGO

Snap-on Wrench Co.  
Manufacturers  
Milwaukee, Wis.

# Snap-on

INTERCHANGEABLE  
Socket Wrenches

Most Complete Line  
Manufactured in the  
United States



Moore & Moore, Inc.

Reading, Pa.

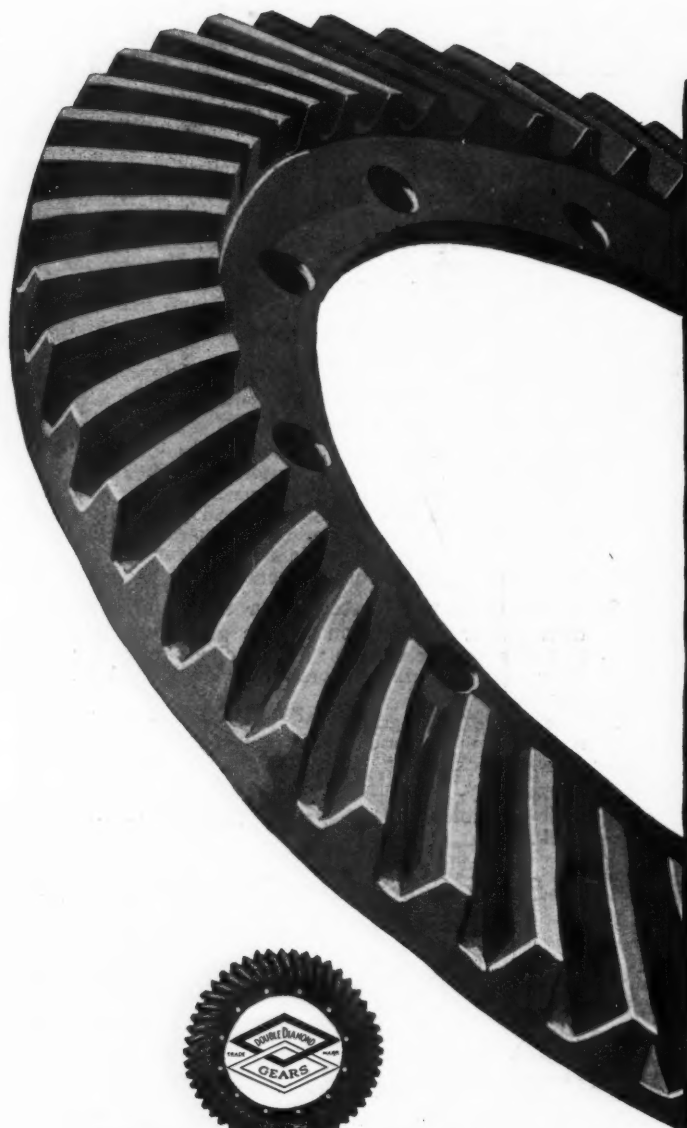
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### 8 Sales Branches

Address Automotive Gear  
Co. as follows:

**ATLANTA** 174 Spring St.  
**BOSTON** 1024 Commonwealth Ave.  
**CHICAGO** 1425 S. Michigan Ave.  
**CLEVELAND** 6305 Euclid Ave.  
**LOS ANGELES** 1213 S. Hope St.  
**PHILADELPHIA** 1404 W. Girard Ave.  
**SEATTLE** 520 E. Pike St.  
**RICHMOND, Indiana** Factory

# Double Diamond Gears



Your business experience has taught you that your source of supply for replacement parts must be **DEPENDABLE** — from the standpoint of both quality and service.

Double Diamond "Nationalized Gear Service" is known to thousands of dealers and service men as the last word in dependability. The quality of Double Diamond differential and transmission gears has always been the highest and these gears now have a nation wide reputation for their fine material and accurate workmanship.

Double Diamond gears for practically all cars are carried in stock in all parts of the United States by many jobbers as well as our eight sales branches. Orders are filled the same day received.

Send your order to the nearest point or write for complete price lists.

We also furnish fly wheel starter ring gears, rear axle shafts and silent timing gears for practically all cars.

## AUTOMOTIVE GEAR WORKS

Incorporated

Factory & General Offices  
8th and South O. Sts.,  
Richmond, Ind.



1

Only three connections:  
the hand throttle carburetor lever and the floor of the car.

2

No cylinder head, transmission or water pipe bolts to remove.

3

Direct action on the carburetor without the use of levers, ball-and-socket joints and other complicated devices.

## **≡ Nine Famous Features**

### **Check Up the Williams!**

When you check up the Williams Accelerator point by point, feature by feature, you'll easily see why it is the leading Ford foot throttle.

Quality-built to outlast the car, it is sold at a price Ford owners are glad to pay—and yet, one that yields jobbers and dealers substantial profits.

Williams Accelerators are nationally sold by leading jobbers. If your stock is low, order today.

**WILLIAMS BROS. AIRCRAFT CORP.**  
1211 VAN NESS AVENUE - SAN FRANCISCO, CAL.

The Williams "Junior" Accelerator retails for \$1.50 and is the best on the market at the price. Concentrate on the Williams line.

## **WILLIAMS ACCELERATOR** *for FORD CARS*



4

Spring action; does not operate against the hand throttle. No springs to connect to the frame.

5

Installed in a few minutes, quickly and easily removed.

6

Allows free use of both hands for driving.

7

Assures a quick, smooth, even get-away.

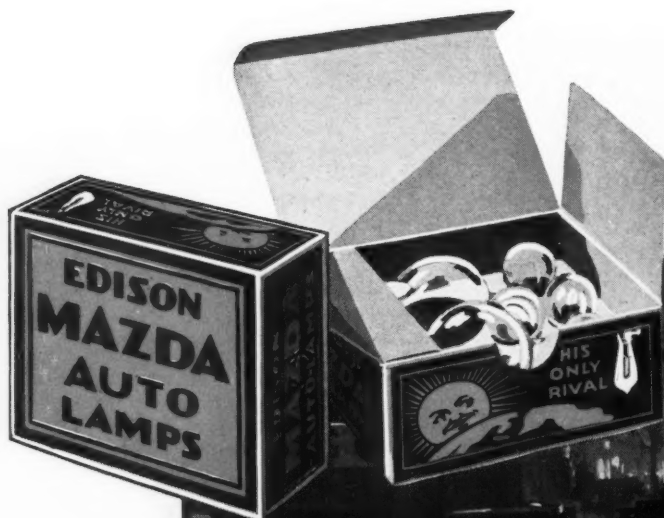
8

Permits throttling down to  $\frac{1}{16}$ th of an inch.

9

Vibration proof; resists wear and tear; guaranteed.

# Days shorter— Lights longer



**N**OW THAT sundown is sooner, motorists must be sure that their lighting is in good order.

The safest insurance against a fine, or against accident, is an Edison MAZDA Auto Lamp Kit.

That's from the motorist's point of view.

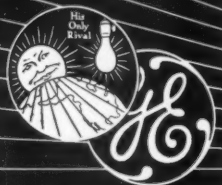
But what interests you more, as a dealer, is the fact that the Kit multiplies your lamp profits by six—and provides the easiest and quickest way to reach your RD contract basis—which *entitles you to 10% extra discount.*

The sale of a single lamp amounts to 20c. or 30c.—while the Kit averages \$1.40.

And every customer who asks for a lamp is a sure prospect for the six-lamp Kit, because he knows that the Kit will save him trouble and money.

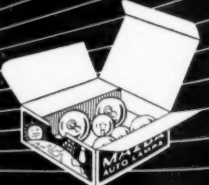
Edison MAZDA Auto Lamps are nationally advertised to make sales easier for you. Now that motorists are buying lamps for the short days, better ask your jobber how you can make that consumer advertising work for you.

Edison Lamp Works of General Electric Co., Harrison, N. J.



## EDISON

## MAZDA LAMPS



A GENERAL ELECTRIC PRODUCT